TECHNOLOGY DEPT

Gas Journal

VOL. 276. 105TH YEAR. LONDON, OCTOBER 7, 1953. NO. 4714. PRICE 1/3

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DETROIT

Intermittent Verticals at WREXHAM...

The Intermittent Vertical Chamber Oven Plant installed at Wrexham has a nominal capacity of 2,250,000 cu. ft. per day. It consists of 25 chambers of 3.65 tons capacity arranged in one bench of 5 settings — complete with coal and coke handling and coke grading plants.

by Jenkins of course

R V.276 Oct.-Dec. 1953.

SERVICE TO THE GAS INDUSTRY

- MAINLAYING
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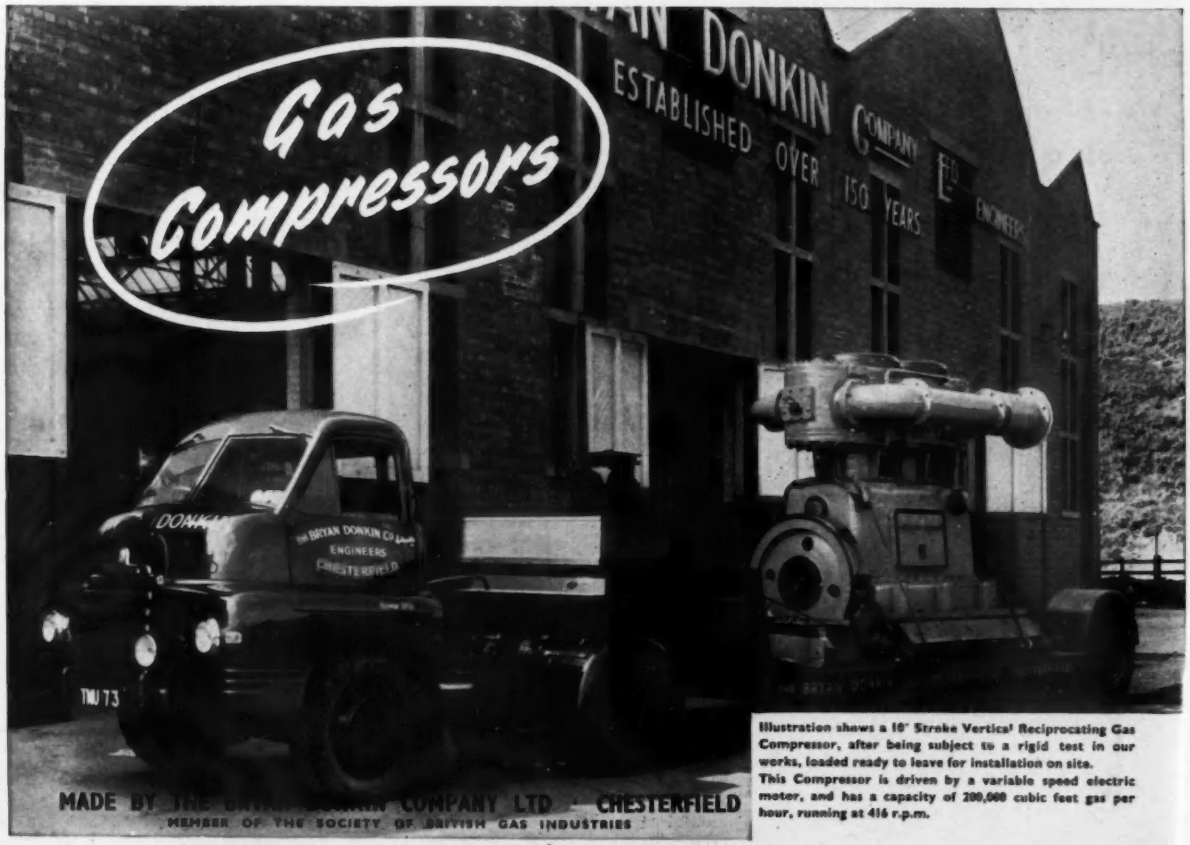

Illustration shows a 10" Stroke Vertical Reciprocating Gas Compressor, after being subject to a rigid test in our works, loaded ready to leave for installation on site. This Compressor is driven by a variable speed electric motor, and has a capacity of 200,000 cubic feet gas per hour, running at 416 r.p.m.

Tech.

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SPERRYN & CO. LTD.,
PLACE AT YOUR SERVICE SIXTY YEARS EXPERIENCE IN THE MANUFACTURE OF HIGH GRADE GAS CONTROL APPLIANCES

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$\frac{3}{4}$, 1 & 1$\frac{1}{4}$ cu. yds.

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● Here is the mechanical shovel that really has a large appetite for hard work. It will prove indispensable in Coal and Coke Yards where continuous production demands a reliable method of mechanical loading, conveying and discharging. Easily manoeuvreable within limited space, it will quickly load, lift and convey, and discharge at any height up to 11′ 0″, but requires only 7′ 0″ headroom. Ruggedly built for rough work and maximum penetration, the Weatherill Hydraulic is designed to give outstanding performance at fingertip effort.

NOTE THESE FEATURES · Totally hydraulic for positive power · Dozer scoop clears front wheels · Controlled tipping of scoop · Automatic tongue release · Scoop retracted and locked instantly · Will excavate below ground level · Low centre of gravity for stability · Driver comfort · All round vision · Cab detachable.

Full details on request

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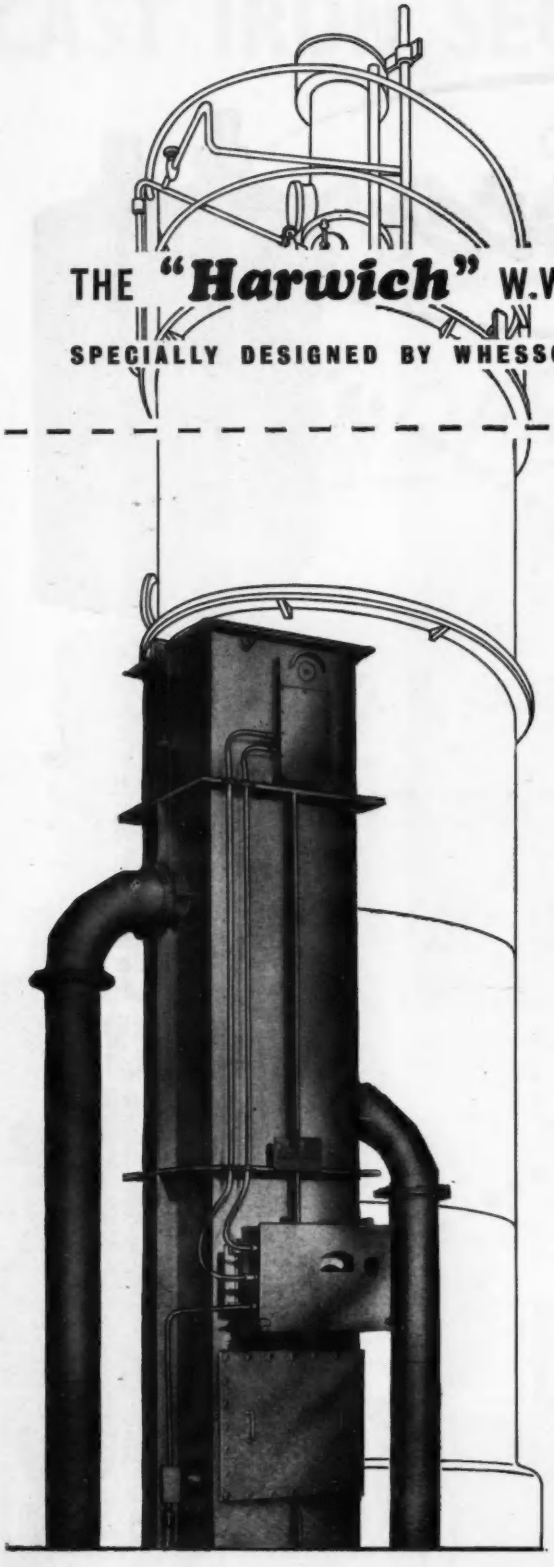
THE "Harwich" W.W-D. ELECTRO-DETARRER

SPECIALLY DESIGNED BY WHESSOE FOR THE SMALLER WORKS



A new version of the W.W-D. Electro-Detarrer is now available in capacities up to 0.75 Million cu. ft. per day

Features of the **"Harwich"** W.W-D. Electro-Detarrer:

- Low capital cost
- Power consumption less than 0.75 kW including insulator heating
- High efficiency tar fog extraction with negligible back pressure
- Integral construction: gas treater and weather-proof electrical equipment built as one unit
- Toughened glass insulator
- No cost for rectifier house, high tension cable or steam supply

Patent applied for.

"Harwich" W.W-D. Electro-Detarrer in operation at the Harwich Works of the Eastern Gas Board.

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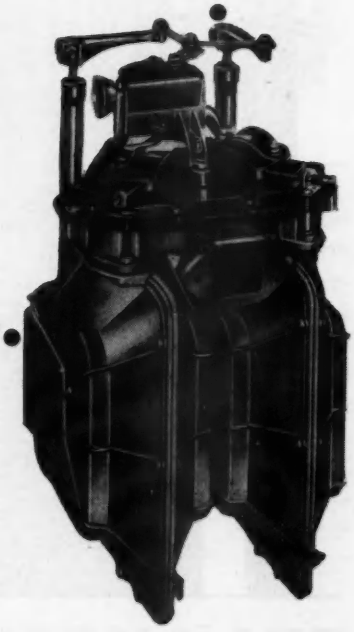
BEGWACO
Flomaster

Three sides to the two-part case



Look at both sides of the Flomaster's neat case—then undo five screws only and look inside. This simplicity and fine finish are the result of advanced design using the latest methods of pressure die-casting. Remove two more screws and withdraw the measuring unit; it is entirely unchanged—the mechanism that has earned such high praise for unerring accuracy and silent, trouble-free service.

BEGWACO METERS LIMITED · QUEEN STREET · FARNWORTH · LANCS

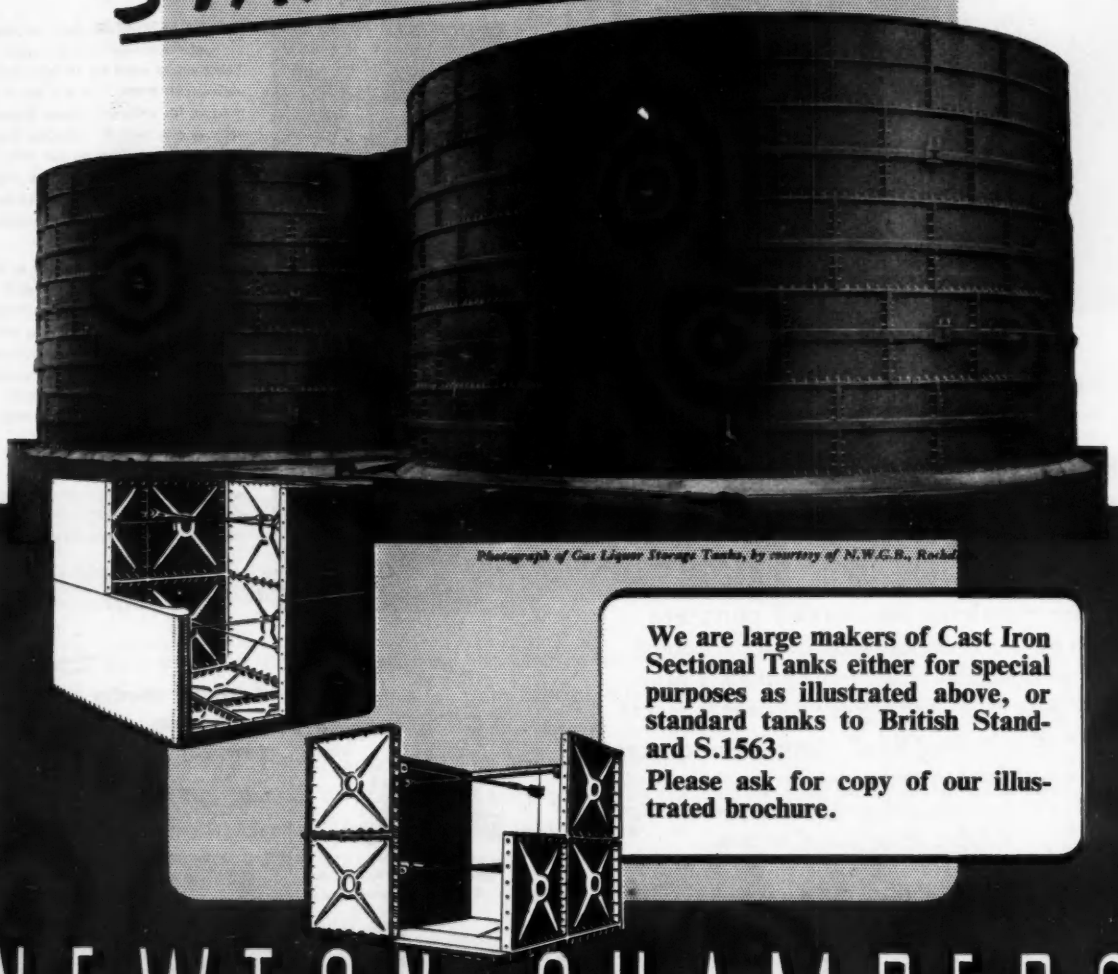
CAST IRON SECTIONAL TANKS

of

SPECIAL

or

STANDARD DESIGN



Photograph of Gas Liquor Storage Tanks, by courtesy of N.W.G.B., Rochdale

We are large makers of Cast Iron Sectional Tanks either for special purposes as illustrated above, or standard tanks to British Standard S.1563.

Please ask for copy of our illustrated brochure.

NEWTON CHAMBERS

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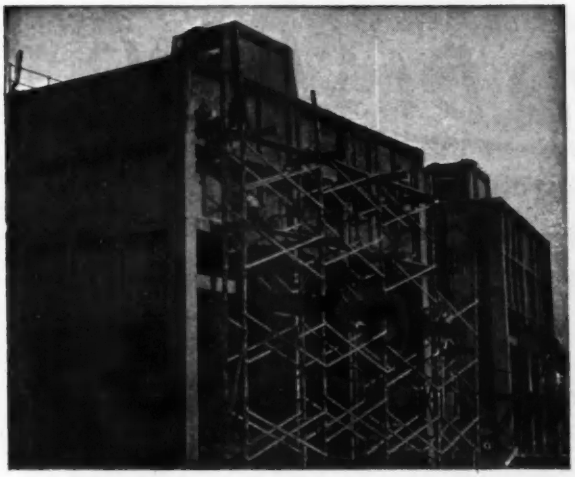
Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

Handbook "GUNITE" sent on request

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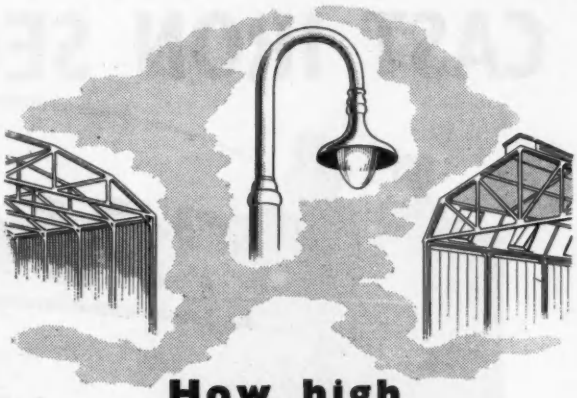
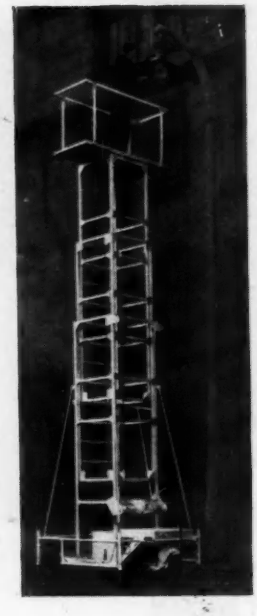
Telephone : Victoria 7877 & 6275



How high are your STANDARDS?



STANDARDS of efficiency—of maintenance—of cleanliness—yes, we mean them all. Things out of reach are too often out of mind, until trouble starts. Yet it is only a matter of bringing the awkward fittings within reach in order to give them the attention they require. Gibson Tower ladders do just that, and have found favour with municipalities, Government departments, and firms throughout the country as the most effective way of stepping up to trouble.

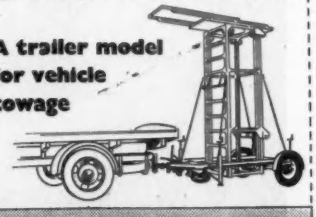
All Gibson Towers are made in aluminium alloy—light and strong. Hand winch operation speedily moves the telescopic frames, while pre-tested ropes and mechanical devices fully protect the operator. Electrically propelled, or hand-and-trailer models are available, and all towers have stabilising jacks, parking brakes, and all those etceteras which mark a well finished job.

Gibson Towers are idea for all high-level maintenance work, outdoors or indoors. Users report that they recover the cost within eighteen months by reduced labour costs.

Please write for our descriptive leaflet.

... and it folds up too!

A trailer model for vehicle towage



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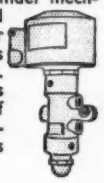
SPECIAL VALVES DESIGNED if required.
STANDARD VALVES DELIVERED ex stock.

MAGNETIC BALANCED 3-WAY VALVE

This valve can be used to control air, water, oils and other liquids, normally passed through a pipe where it is required to operate Diaphragm Valves, single acting and double acting cylinder mechanisms, etc. Standard valves are suitable for controlling pressures up to 70 lbs. per sq. in. or 100 lbs. per sq. in. as required. This type of valve is capable of operating at high speeds over long periods.



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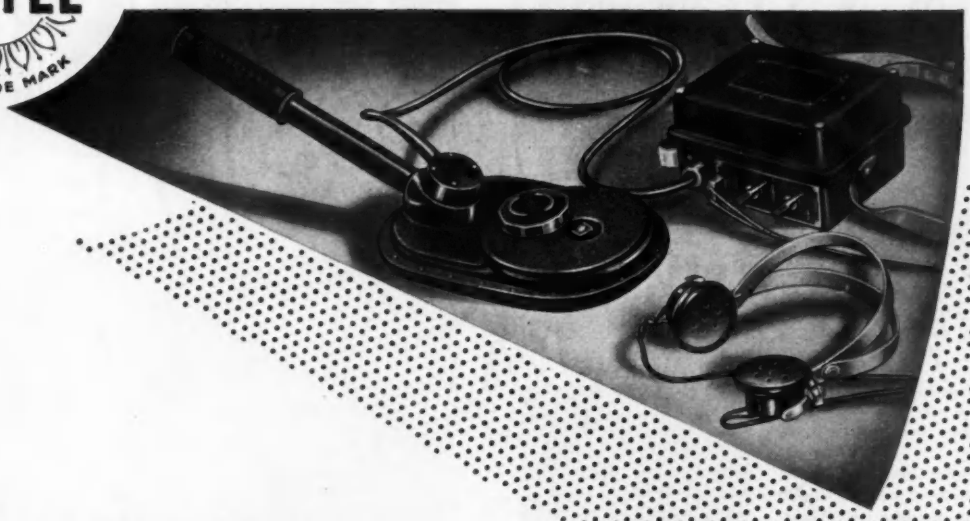

The 'CINTEL' PORTABLE
METAL DETECTOR is
still the best method of locating stop-cock
boxes, manhole covers, etc., the exact
positions of which are unknown. And with the aid of
an oscillator attachment, pipes buried to a depth of 30 feet
can be easily located and their routes traced.
This instrument is used today by most of the principal gas
and water undertakings in the country and full details
will be sent to you on request.

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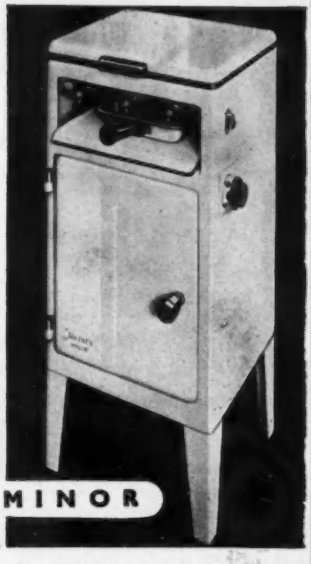
PIPES CARRIED THE GAS
to public and domestic fittings upon which the full force of the Victorian metal workers' art had been lavished. From those early days of the "new gas light" right up to the present moment Staveley pipes have maintained their leadership in serving the gas, water and sewage disposal requirements of communities at home and abroad.
STAVELEY
THE STAVELEY IRON & CHEMICAL CO. LTD. NR. CHESTERFIELD

BIG Capacity for LITTLE Kitchens

Especially suited to the kitchens of flats and small houses, this highly efficient cooker provides utmost cooking capacity in the least possible space. Cast iron construction ensures strength and durability and reduces maintenance costs to a minimum, thus making the Dainty Minor particularly suitable for simple hire or hire purchase.



Approved and adopted by leading gas boards

The **Dainty** MINOR

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WITH **Secomak**

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Dust and damp can cause serious breakdowns —particularly in equipment which cannot be brushed out. The answer lies in "Secomak" Portable Electric Blowers—the most powerful obtainable and equally useful as suction cleaners. Model 7 weighs only 10 lb. but delivers air at 340 ft. per sec. Model 70 weighs 15 lb. and delivers air at 425 ft. per sec. with static pressure of 33" w.g.

Both models will blow air at temperatures of 200° C. with the "Secomak" Heater Attachment.

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There are
TWO TYPES
of
RAWLBOLTS

For heavy plant or equipment, which can only be levered or dragged into position, the Loose Bolt type is best. The shield is inserted into the hole and is flush with the surface; therefore, it does not hinder the movement of the plant or equipment to be fixed.

The Bolt Projecting type is ideal for walls where the projecting bolt acts as a rest for the equipment until the nut is tightened on.

Grouting is not required. The hole is bored with a Rawlplug hand or power tool and the Rawlbolt obtains a vice-like grip by the expansion of the metal shields against the sides of the hole.

Rawlbolts range from $\frac{3}{16}$" to 1" diameter and there is a correct hole boring tool for every size. It is only necessary to give the same reference as for the Rawlbolt to get the right tool.

Ask for Free Rawlbolt Reference Chart which illustrates all the actual sizes of both types of Rawlbolts and gives details of boring tools.

B341B

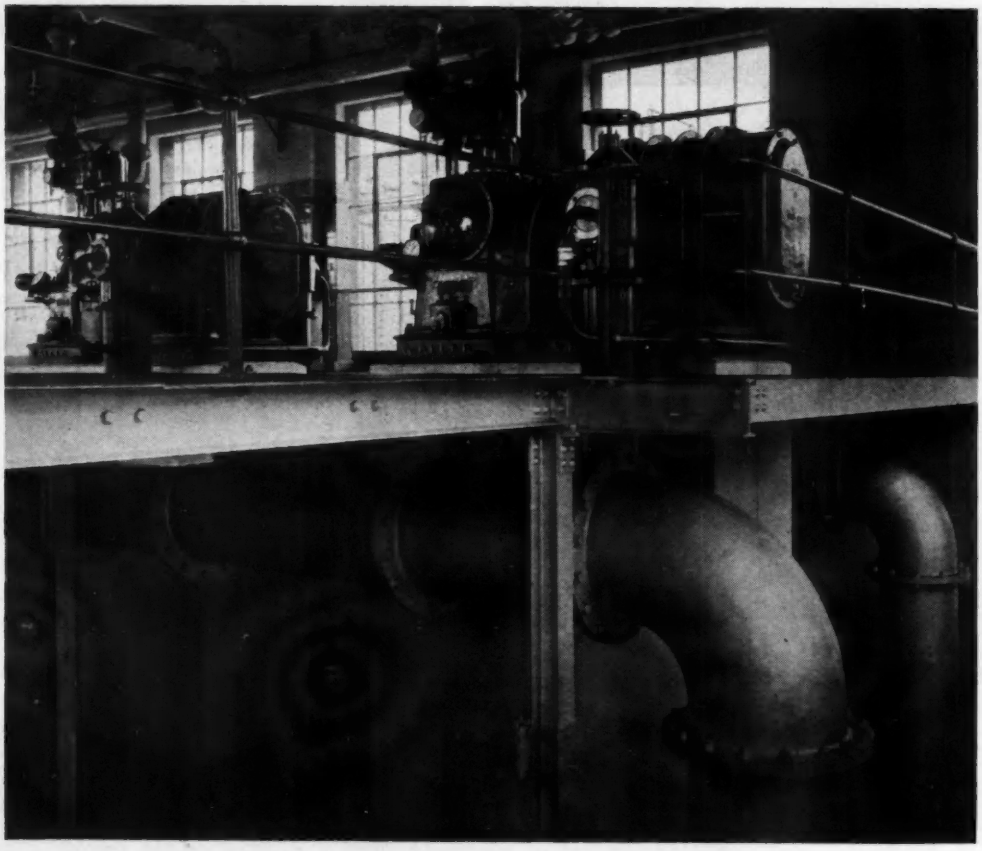
THE RAWLPLUG COMPANY LTD., CROMWELL ROAD, LONDON, S.W.7

SIMPLICITY

The photograph below
illustrates clearly how simply the inlet and outlet
connections and foundations can be arranged when

WALLER EXHAUSTERS AND **BOOSTERS**

are installed. If overhead connections are used it is equally simple.



Photograph by courtesy of Eastern Gas Board.

GEORGE **WALLER** & SON LTD.

PHOENIX IRON WORKS, STROUD, GLOS.

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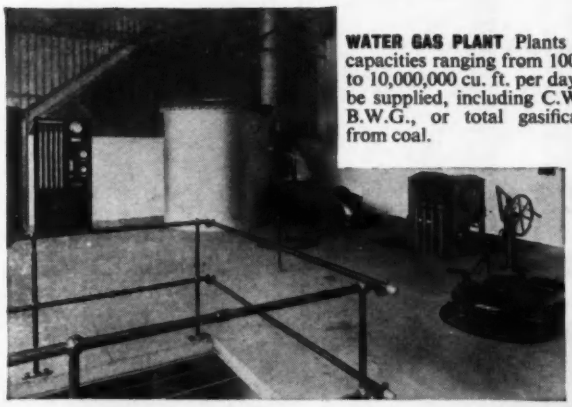
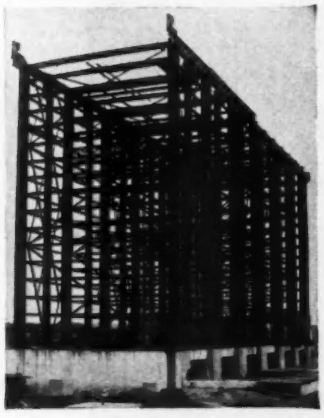


WATER GAS PLANT Plants with capacities ranging from 100,000 to 10,000,000 cu. ft. per day can be supplied, including C.W.G., B.W.G., or total gasification from coal.

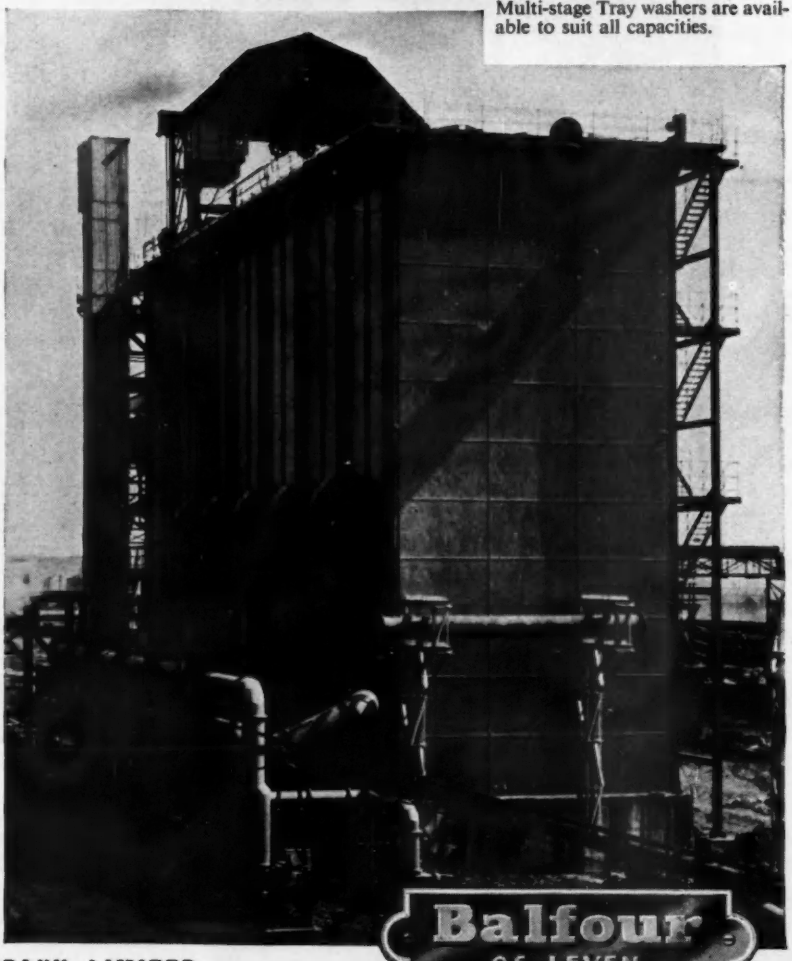
(ABOVE) **WASHERS** Static Washers, Tower scrubbers, Livesey and Multi-stage Tray washers are available to suit all capacities.

BALFOUR-LECOCQ TOWER BOX PURIFIERS

(BELOW) An early stage of erection of the plant at the Southall Works of the North Thames Gas Board. Capacity 7,500,000 cubic feet per day. (*Photograph by courtesy of the North Thames Gas Board*).



(RIGHT) The first installation put into operation at the Car House Works, Rotherham at the East Midlands Gas Board. Capacity 10,000,000 cubic feet of gas per day. To be extended to 20,000,000 cubic feet per day. (*Photograph by courtesy of the East Midlands Gas Board*).



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Electrolux Gas Refrigerators backed by a

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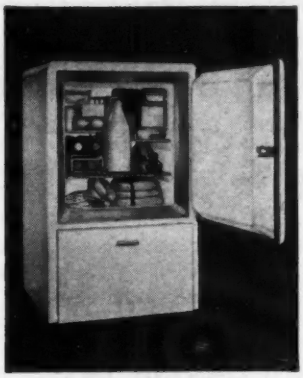
Year Guarantee

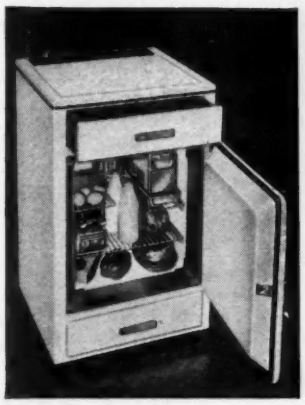
on the

Silent Cooling Unit



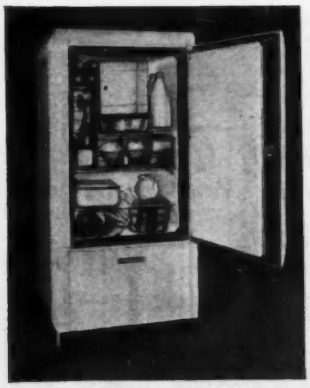
L.150 £54.18.10 (*tax paid*)

Free standing cabinet of modern design. Internal volume : 1½ cubic feet. Shelf area: 3½ square feet.



L.H.150 £57.17.4 (*tax paid*)

A new model with table top and drawer. Internal volume: 1½ cubic feet. Shelf area: 3½ square feet.



L.450 £108.16.11 (*tax paid*)

An 'extra' size refrigerator with four removable shelves. Internal volume: 4.6 cubic feet. Shelf area: 8.4 square feet.

L.700 £143.5.10 (*tax paid*)

A handsome cabinet for all installations where generous capacity is required. Internal volume : 7 cubic feet. Shelf area : 12½ square feet.

L.300 £82.6.5 (*tax paid*)

Family size refrigerator. Internal volume : 3 cubic feet. Shelf area : 5.8 square feet.

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Electrolux *Excels* in proved reliability

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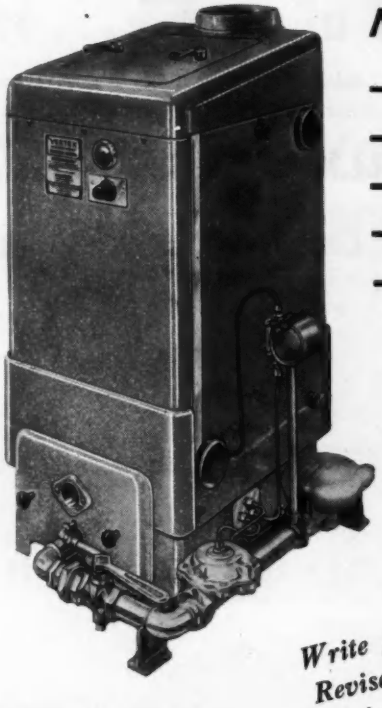
SIMPLIFIED

- Removable door for flue inspection
- Attractive vitreous enamel finishes
- Reliable flame failure device
- Welded steel construction



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- For Central Heating and Direct or Indirect Hot Water Supply.
- Combustion conforms to B.S.S.717
- Lower maintenance costs

Boiler Size	Output B.Th.U.'s on 500 C.V. gas	Height	Depth	Width
No. 0	50,000	3' 0"	2' 2"	1' 4"
No. 1	80,000	3' 1"	2' 6"	1' 10"
No. 2	160,000	3' 9"	2' 6"	1' 10"
No. 3	200,000	4' 5"	2' 6"	1' 10"
No. 4	300,000	3' 10"	3' 7"	2' 4"

The "VERTEX" GAS FIRED BOILER

AUTOCONTROL BOILERS LTD.

Write for our Revised 1953 Price List.

GAS-FIRED VERTEX CENTRAL HEATING & HOT WATER SUPPLY VESTA CENTRAL HEATING & HOT WATER SUPPLY BOILERS

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New bridge over the River Tawe at Abercrave constructed for the Brecon County Council. It is believed to be the longest single span prestressed concrete bridge in this country which carries an "A" class road. The concrete girders are 85' 2" long and weigh 38 tons each.

CONSULTING ENGINEERS : L. G. MOUCHEL & PARTNERS LTD.,
COUNTY SURVEYOR : J. M. RICHARDS, M.I.MUN.E.

ROBERT M. DOUGLAS (CONTRACTORS) LTD.
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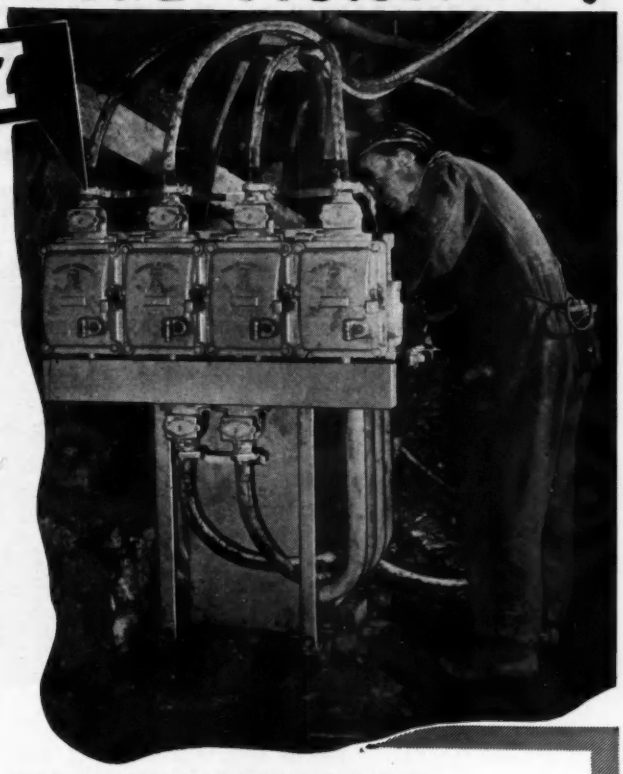
Full EARTH-LEAKAGE Protection!

SAFETY

the first consideration of this

LIGHTING DISTRIBUTION BOARD



The Siemens-Schuckert Flameproof Distribution Board, built up from individual units, not only gives automatic overload protection, but also incorporates full series Earth Leakage protection.

This is the only Lighting Distribution Board providing earth leakage protection, certified for Groups I and II gases.

No greater tribute could be paid to the safety afforded by the Siemens-Schuckert Distribution Board than to have been selected for use in the first underground television broadcast from a coalmine. This equipment was installed to give adequate electrical protection to the floodlighting and also to comply with Mine safety requirements.

Photograph by HAYWARD SMEAD, *"Coal" Magazine.*

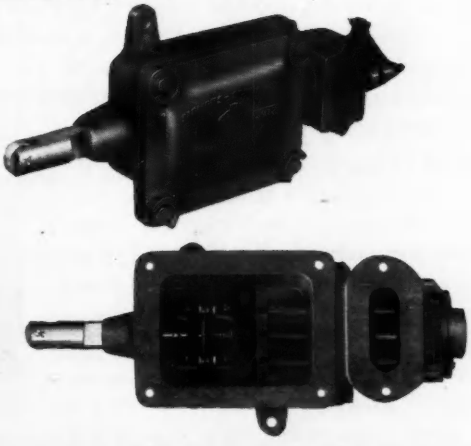
FOR AUTOMATIC or SAFETY CONTROL —a new Flameproof Limit Switch

Machinery operating in gaseous or dust-laden atmospheres often requires an automatic stopping and starting switch or an emergency stop to operate when a certain limit is reached.

This new Flameproof Limit Switch meets that need and has been certified for both Group I and Group II gases.

A similar switch for Group III gases will shortly be available.

Write for detailed specification.



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Telephone : EALING 1171-6. Telegrams : Siemensdyn, Brentford, Hounslow.

BIRMINGHAM : Tel. Midland 2082. **CARDIFF.** **GLASGOW**: Tel : Central 0171.

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2 MINUTES PER LORRY !

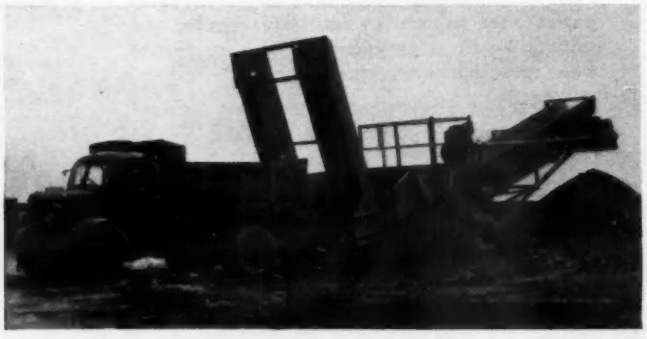
Discharging waste safely over the brink of a 100 ft. deep pit at the rate of 180 tons per hour.

The KANGAROO, Crone & Taylor's latest loader, which comprises as a single unit, ramp, hopper and conveyor, works at a speed that drastically cuts the cost of storing operations.

In 2 minutes it deals with a 6 ton lorry load of waste, in which time the lorry is backed up the ramp, tipped cleanly without spillage, driven off, and its load transferred from the hopper to the pit (or a system of conveyors). 180 tons per hour !

The KANGAROO, which is powered by a diesel engine, is not only quick, it is extremely manageable. Hand-operated hydraulic equipment raises the ramp, and a tow-bar enables the machine to be moved into a new position by any of the lorries that feed its hopper. It is fitted with brakes and can be towed along the highway.

Note the good proportioning and sturdy, rigid construction of the KANGAROO. As the ramp is lowered, the wheels at the feed-end of the conveyor are automatically raised two or three inches above ground level, and are thus freed from all weight and strain during conveying operations.



Full particulars of this revolutionary, fast-operating machine will be sent on request. Please write for leaflet CT. 853

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If you are faced by any conveying or storing problem, please consult us. Our advice is freely at your disposal.

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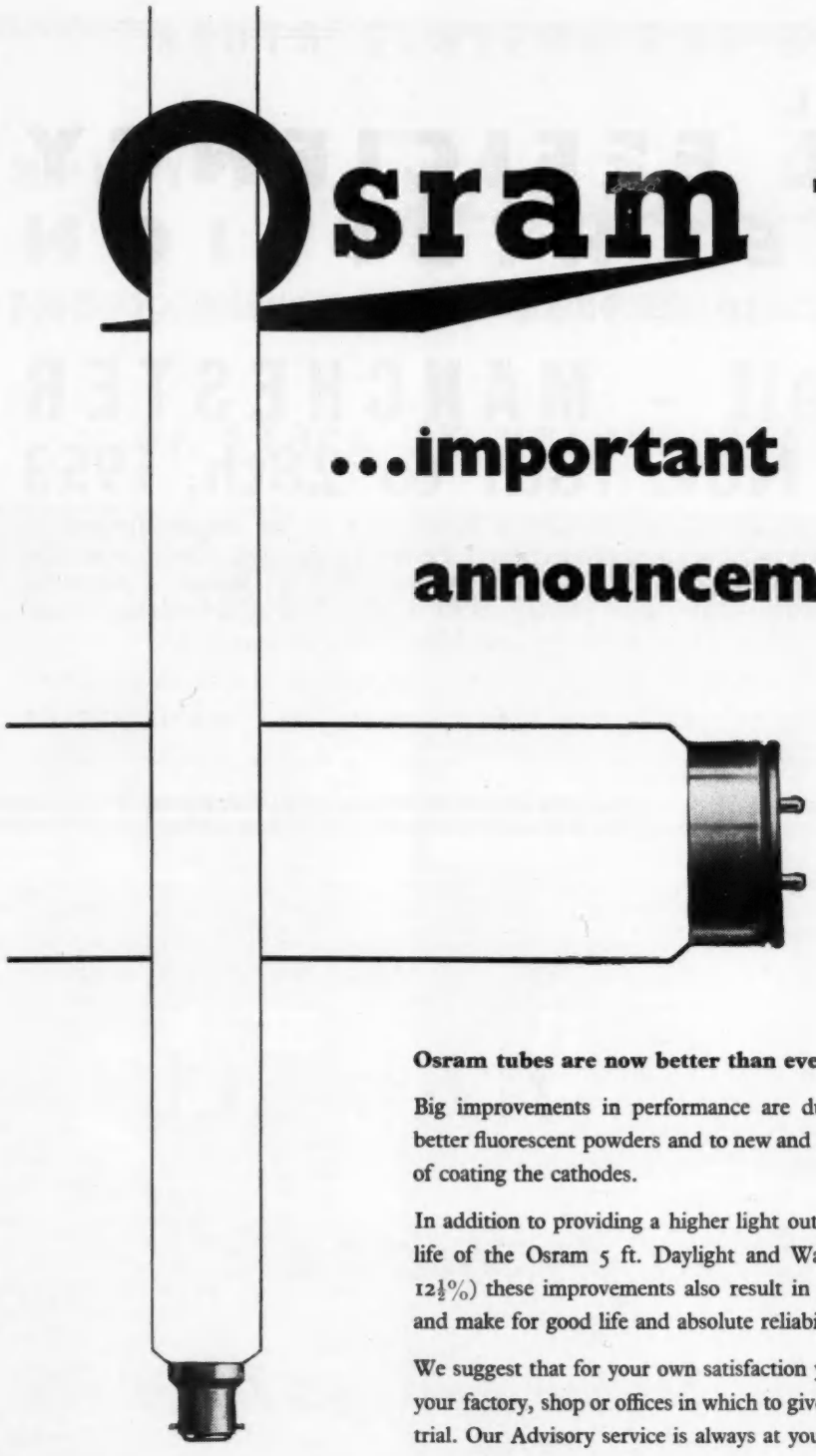
Osram TUBES

...important announcement



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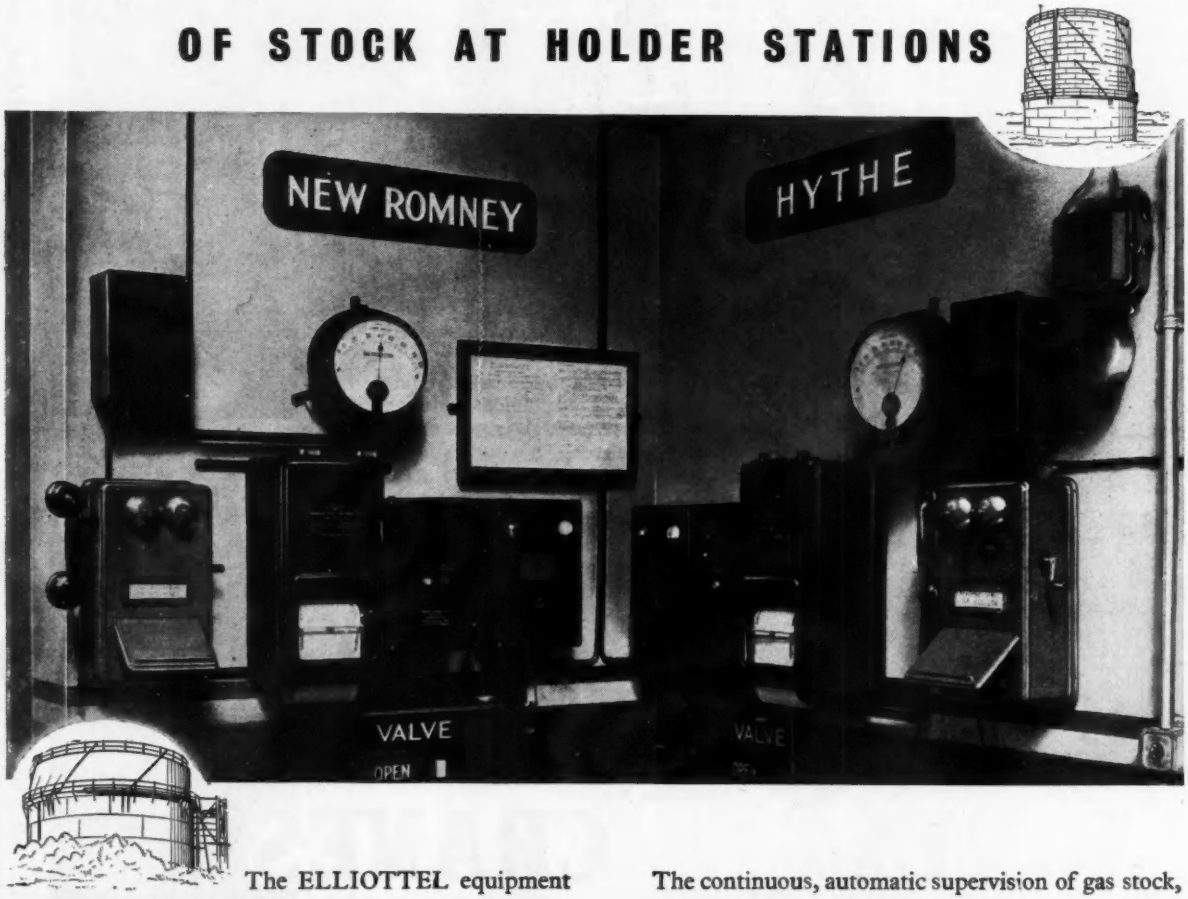

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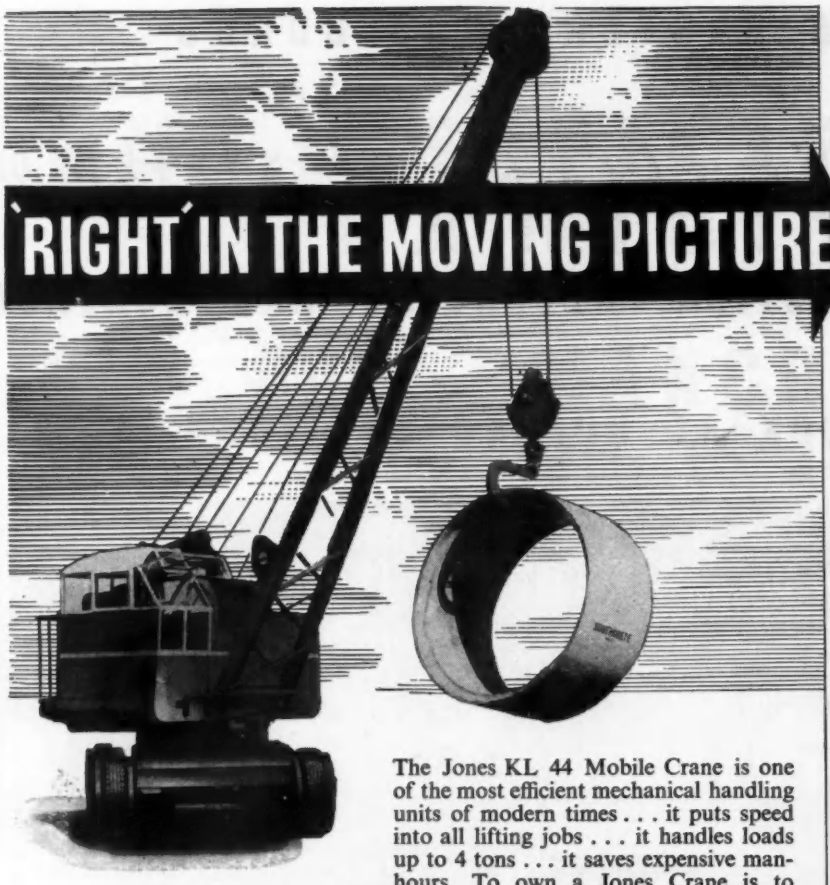

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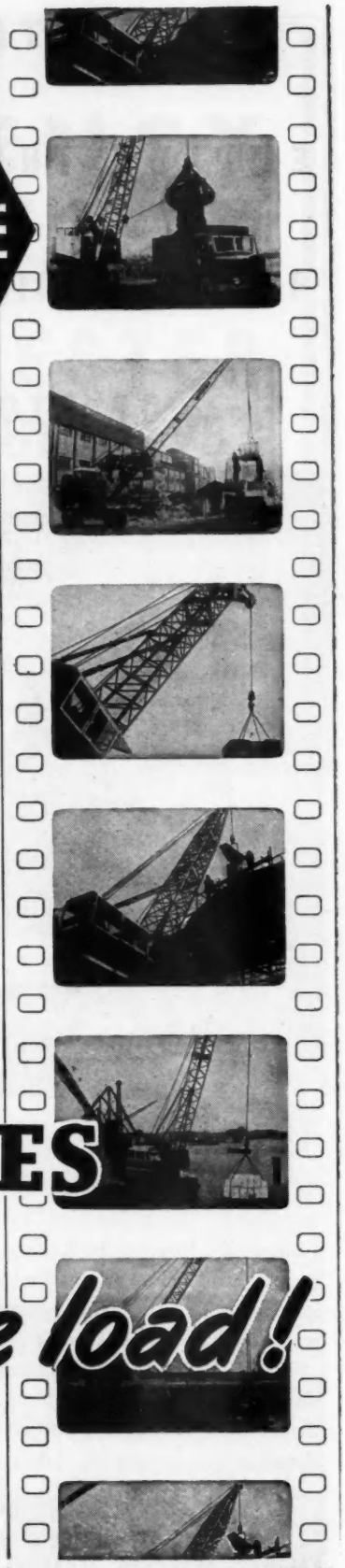

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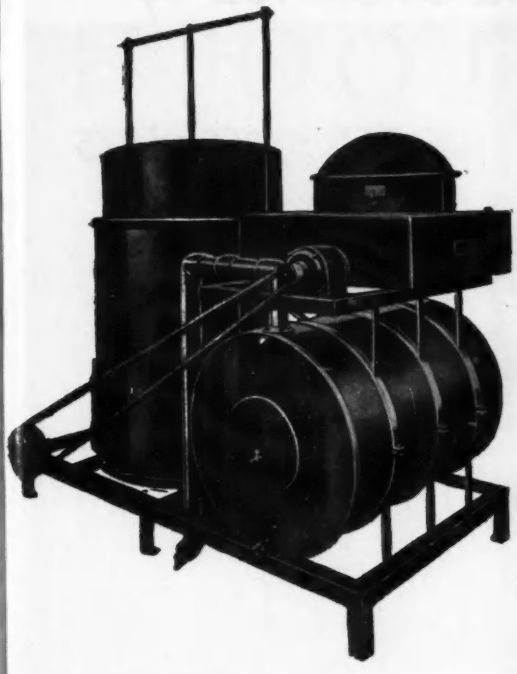

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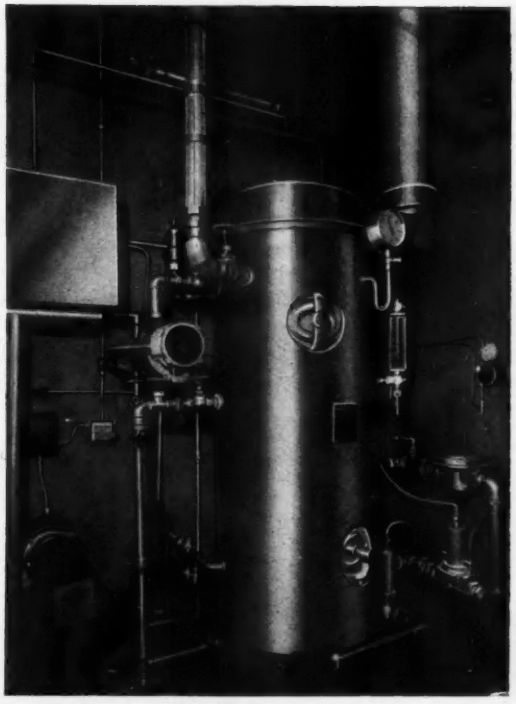

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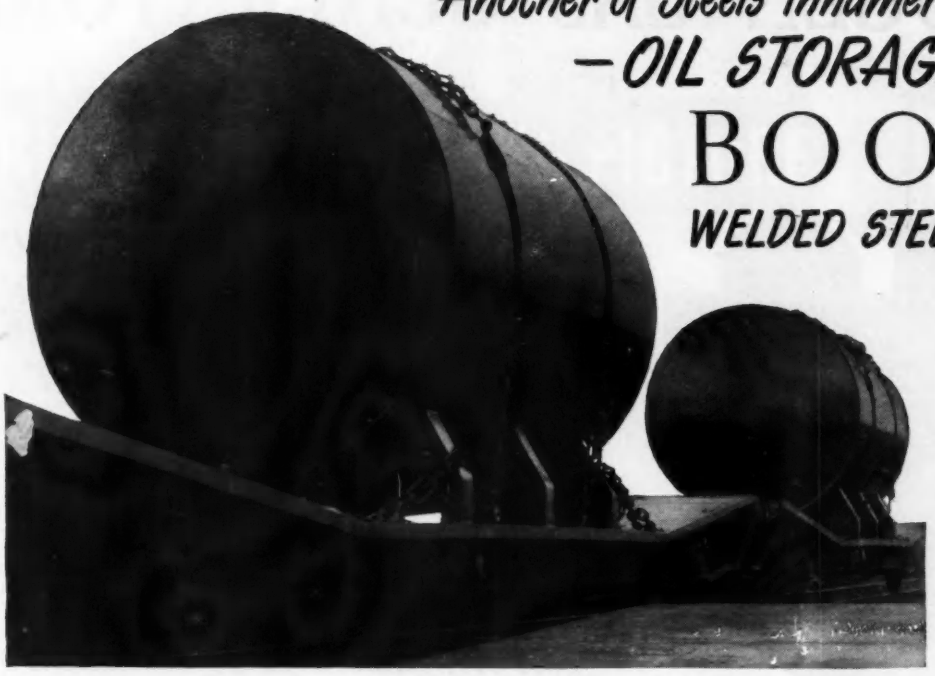

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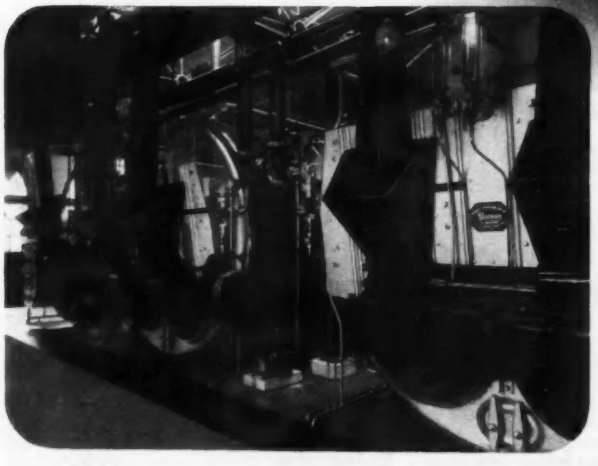
EE's

Illustrated is an installation of Paxman Economic Boilers



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Despite the smaller space occupied, the heating surface is comparable with that of any other Boiler thus effecting fuel ECONOMY.
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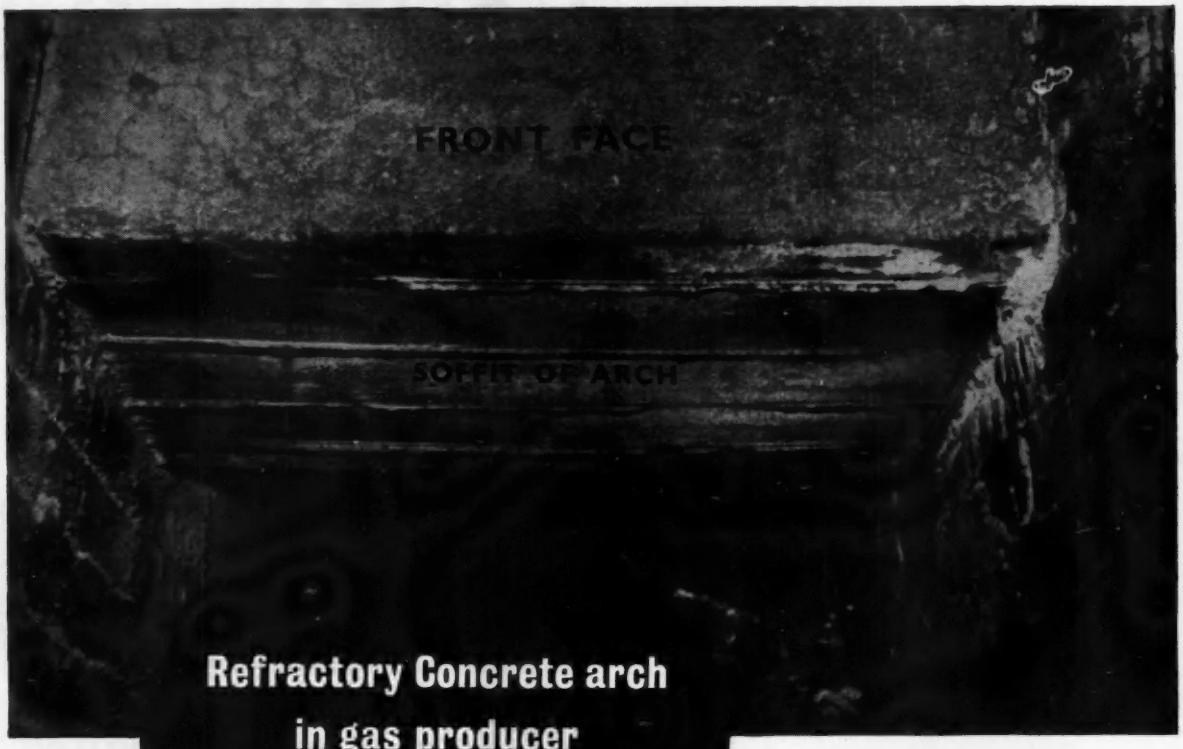
the adaptable refractory material



Refractory Concrete arch in gas producer

after 2 years Continuous Duty

Photo by courtesy of J. W. Young Esq., M.Inst.Gas E., Lurgan Borough Council, Gas Dept.

The wide variety of uses for Refractory Concrete include Retort House Floors, foundations, door linings, Producer linings, charge hole blocks, retort settings, flues, flue pipes, flue linings, quenching floors and cars, coke shoots, top paving, inspection block and plugs, carburetter head tiles, dampers, lids, special shapes, sole patching, charge hole blocks, brickwork mortar and general repairs.

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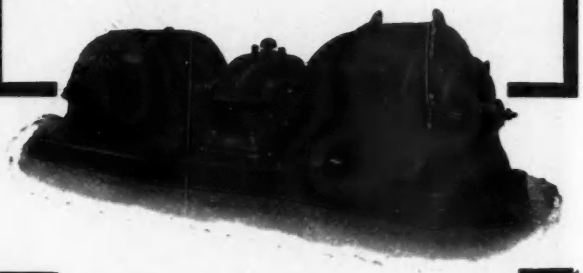

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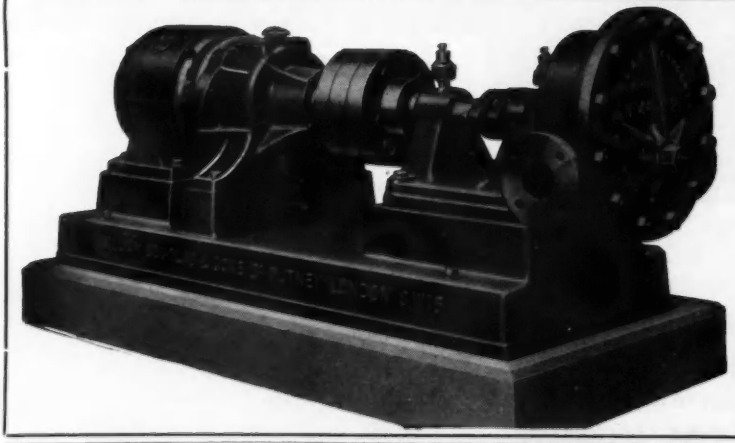

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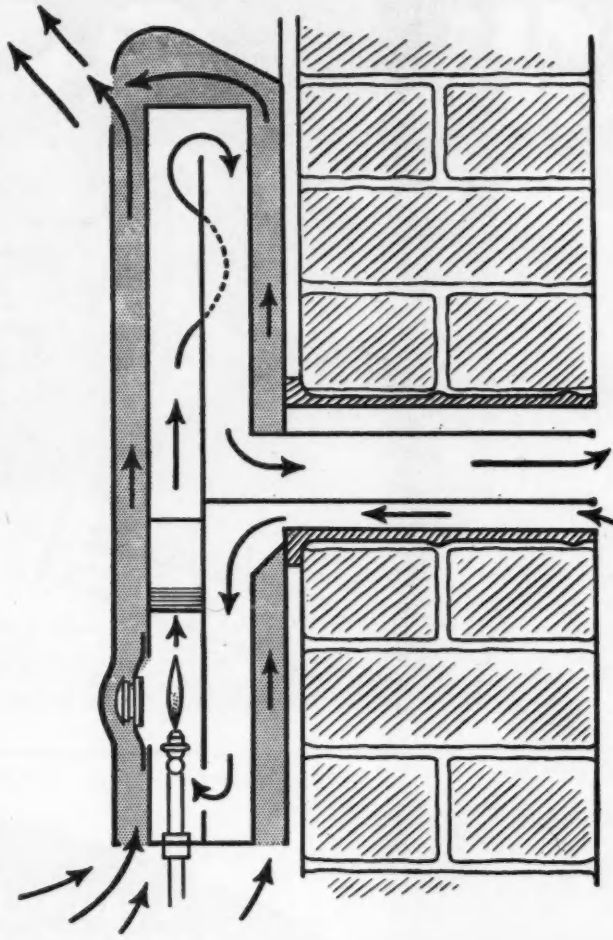

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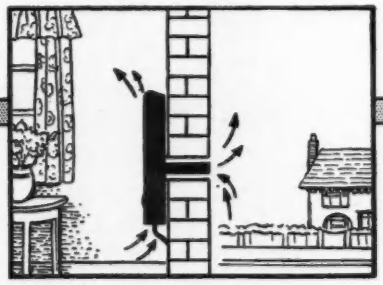

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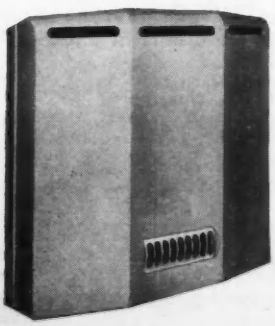

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H.P. DISTRICT GOVERNORS

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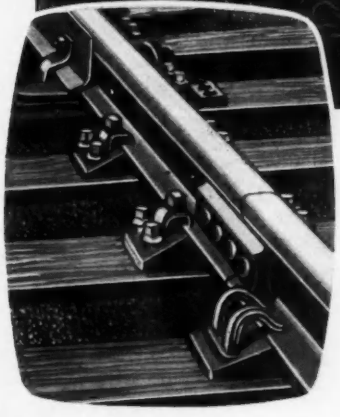

109 lbs. F.B.

rails are used throughout this siding. The inset shows the detail of fastenings for this type of rail.

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SC/25

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Four covers are provided to each box, size 16′ 10″ × 9′ 10″.

The Purifiers are worked by means of 24″ dia. Mains.

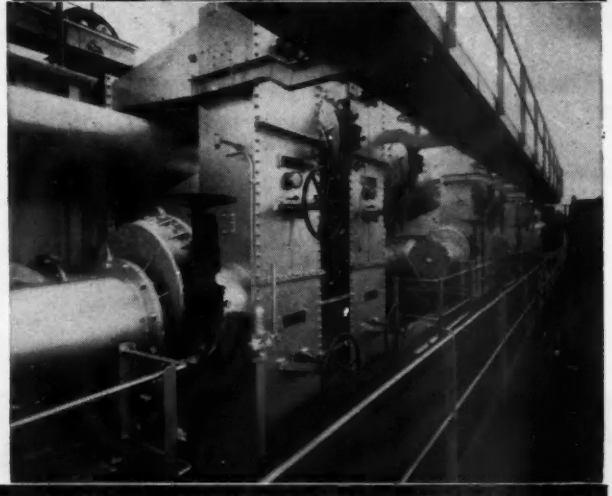
Also fitted to the boxes are Patent Reverse and Divided Flow Valves, to the Inlet and Outlet of each Purifier Box.

The Oxide Handling Plant consists of a 15″ wide Bucket Elevator and a 24″ wide Flat Belt Conveyor capable of dealing with 28 tons of Oxide per hour.

All are mounted on a Travelling Transporter Gantry which also incorporates Four Lifting Screws for lifting the Purifier Covers.

Top Right : View on Purifier Deck showing 16′ 10″ long × 9′ 10″ wide Purifier Covers, in the fitted position, together with clamps, etc.

Bottom Right : View of Connection side of Purifiers showing the 24″ diameter Patent Reverse and DividedFlow Valves, with connecting Ducting and Valve operating Platforms.



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Telephone : Leeds 32521.
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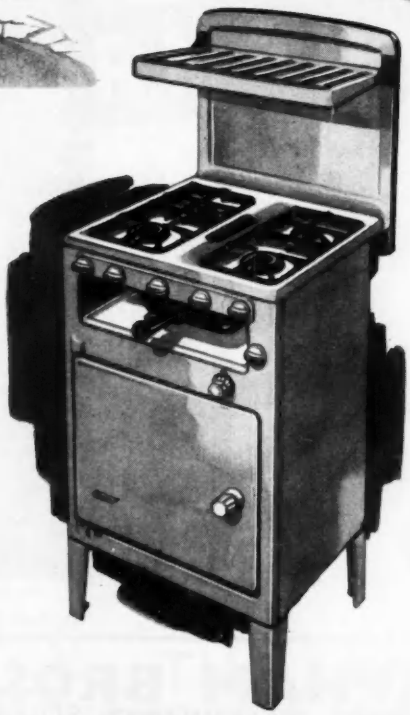

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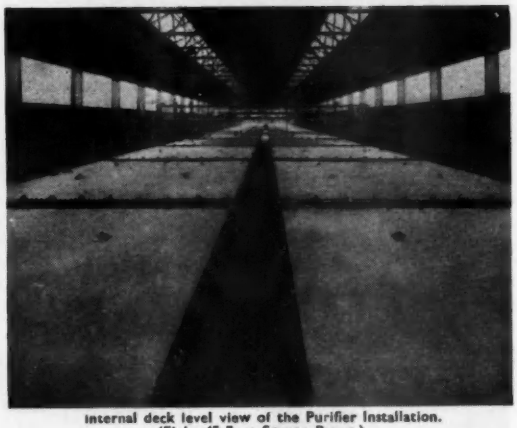
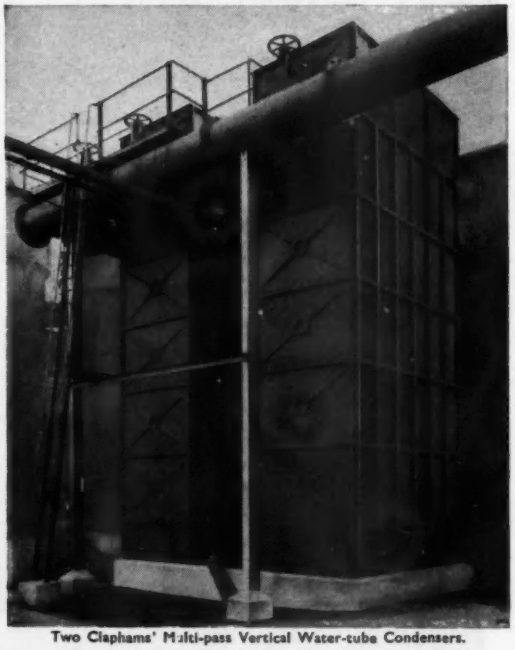
- Condensing Plant
- Tar Extractors
- Washers (Pumpless Patent)
- Oxide Purification Plant
- Boxless Purifiers (Prov. Pat.)
- Liquid Purification Plant
- Mechanical Handling Plant
- Coke and Pan Ash Washers
- Purifier Control Valves
- Gas Pre-Heaters
- Briquetting Plants
- Refractory Brick Making Plant
- Special Pipes and Connections in cast iron and steel

Two Clapham-Barwick Pumpless Static Ammonia Washers.



Internal deck level view of the Purifier Installation. (Eight 45 Feet Square Boxes.)



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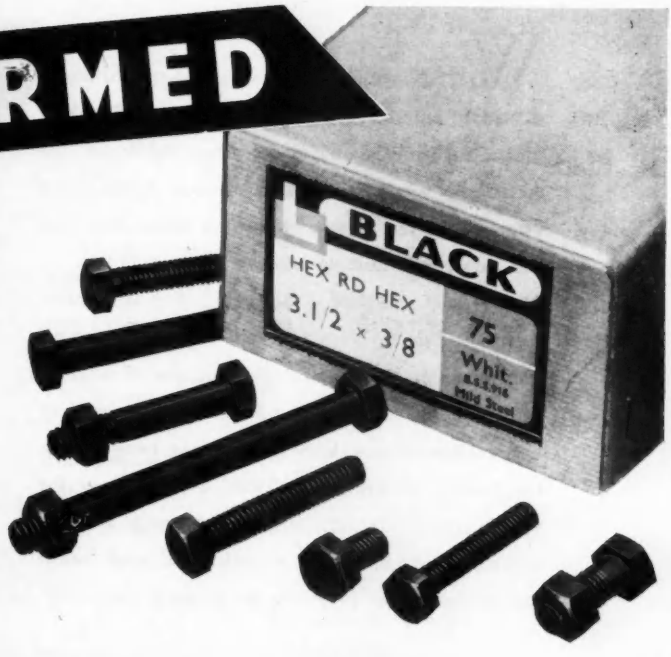

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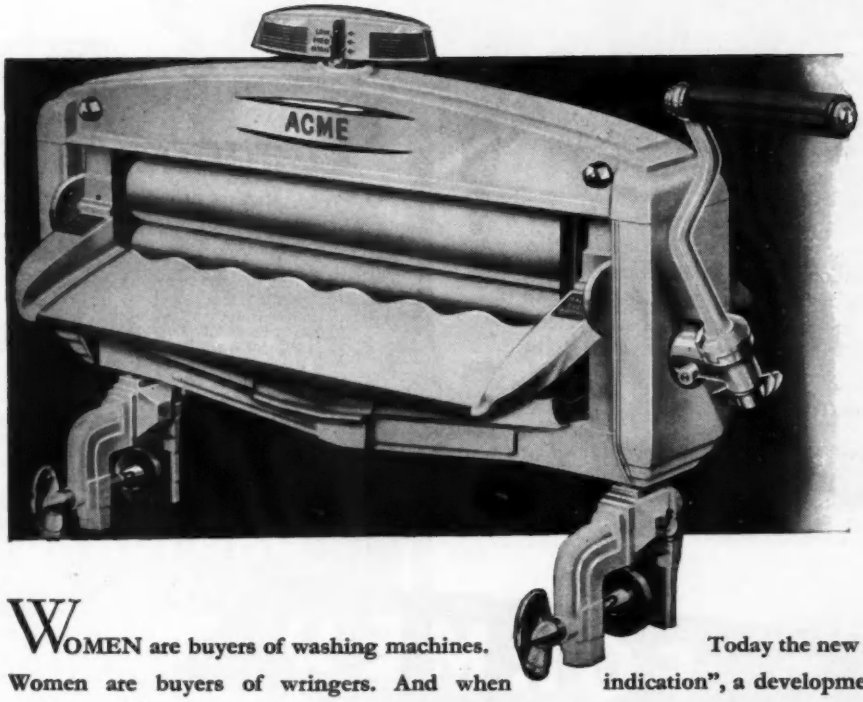

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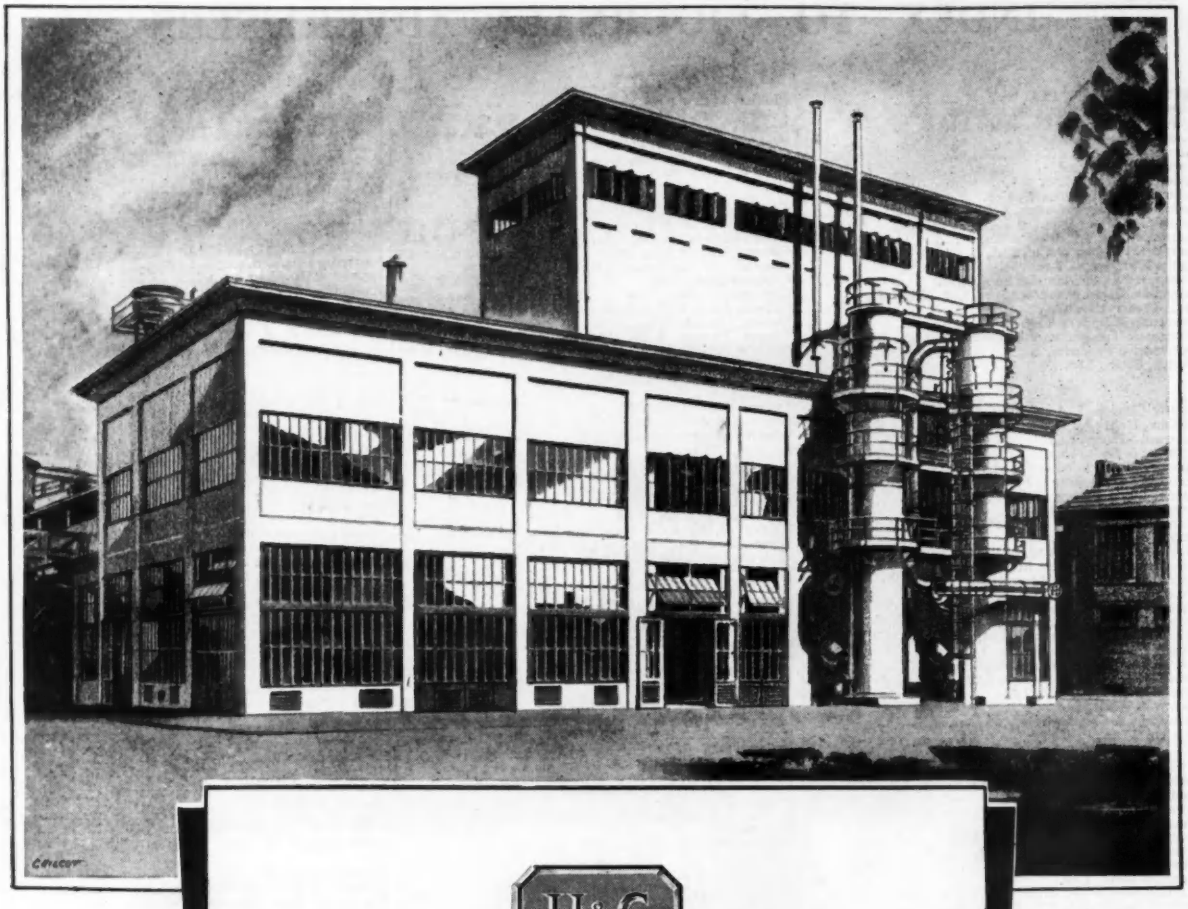

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GAS JOURNAL

VOL. 276. No. 4714 105TH YEAR October 7, 1953

THE NATIONAL FUEL POLICY

The question to which Mr. Gerald Nabarro, M.P., addressed himself at the meeting of the North West Fuel Luncheon Club on September 23 was 'What progress are we making towards a national fuel and power policy?' He was in good form. Coal, gas, electricity, in addition to industrial fuel technicians and consultants were well, and pretty evenly, represented in his audience. He did not pretend to expert knowledge himself. He spoke as a political observer. There might be, he said, some half-dozen members of the House of Commons who had made a careful study of the fuel and power question from that point of view. His duty and theirs was to keep it before the Government. So urgent did they consider it to be that they hoped next session to persuade the Government to decide upon a definite policy.

Citing first the Simon Report of 1946 and then the Ridley Report of 1952 there was a plethora of data extant. What we lack is the capacity to act upon it. Coming to the end of 1953 we saw industrial production rising, bustling activity, everyone busy and prosperous. Only coal gives cause for anxiety. Stocks are 2 mill. tons less than at this time last year. Consumption *and* absenteeism are rising. 'Indignity of indignities, we are resorting to the importation of coal.' Coal, he said, was the Achilles heel of our economy.

What progress, then, had been made? The Minister had set up a Fuel Efficiency Committee and established the non-profit making advisory company. A more promising measure was that of fiscal inducement in the new loan scheme under which industrialists would be lent money to purchase fuel-saving equipment. Loans would be free for two years, after which repayment would be spread over 20 years reduced for taxation purposes by cost of maintenance—a not ungenerous scheme of which industrialists should be more fully informed. A survey of back pressure turbine capacity throughout the country is to be undertaken. And a technical committee has been set up to enquire into the cause and cure of smoke pollution—though he was sure that technologists knew all about it already.

Four faltering steps in the right direction. But the problem is becoming one of the most urgent. Rising production means greater coal demand. But the main figures are well known. We may even have acute coal shortage this coming winter; but what would the position be just seven years ahead? The National Coal Board was aiming at an annual production of 240 mill. tons by 1960, the Ridley Committee estimated we should need 260, the F.B.I. who knew more than either of the real needs of industry put it at 290 mill. tons. It was vitally necessary that we must have at once a fuel policy which will save at least 30 mill. tons of coal a year.

Some in Mr. Nabarro's audience were not at all pleased with what he said about the attitude of the British Electricity Authority towards the back-pressure turbine and the combination of heat and power supply. There was some confusion there. He had cited an example of the distribution of steam in New York, but a questioner pointed out that this was an instance in which steam was raised *ad hoc* in boilers. It was interesting to note that electricians appeared to be a long way from big schemes in which their deplorable thermal efficiencies might be improved by the installation in suitable situations of back-pressure turbines exhausting to district heating schemes.

Mr. Nabarro did not shrink from definite proposals. He had been struck by the firm stand taken in the Fuel Conservation Report, from which he quoted at some length. He was convinced that any national fuel policy must include a unification of purpose of the three nationalised fuel industries. He repudiated the doctrine of free competition between them—it just meant that the best salesman won, not that the best fuel or the best appliance, in the national interest, was used. He might have said the same of freedom of choice by the consumer, though in answer to a question he did point out that there can be no freedom of choice while coal and coke are rationed and gas and electricity are not—only one, of course, of the difficulties in the way of freedom of choice, a subject not to be developed here.

He was convinced that there must be central guidance, by agreement, to guide consumer opinion and to direct the use of coal and capital investment. Mr. D. P. Wellman, Chairman of the North Western Gas Board, drew a reply in which Mr. Nabarro agreed that any central board should be confined to the direction of policy. There must be no interference in the day-to-day operations of the several industries. No competent executive would stand for that. But in his main statement he visualised a board to implement policy with sufficient authority to see that the policy was really

carried into effect. Apparently he thought authority was necessary because of some 'irreconcilable interests.'

Among the cardinal features of such a policy Mr. Nabarro suggested there should be a fusion of selling policy between gas and electricity. Here he cited the example of the combination of selling organisations of the two industries in France, to which we ourselves have called attention. While the gas industry was developing as a two-fuel industry he was not persuaded that local authorities are fully cognisant of their responsibilities, not only to see that appliances capable of using solid smokeless fuels are installed in, for example, new housing, but to see that such fuels are actually used in the appliances installed. He was not sure either that modern solid fuel appliances reached the desired high standard—we must prescribe a higher standard of efficiency and be ready with financial incentives to ensure its manufacture and installation.

In industry generally only certified firemen should be employed on boiler operation (as, for instance, in Canada). Here he claimed the co-operation of the trades unions. There should be an expansion of advisory services. Fuel and heat consultants were by no means fully employed. There was room for great improvements in the insulation of new and existing buildings—a direction in which relatively little expenditure would realise large savings in fuel consumption. And we must have more coal from the mines.

There was the usual peroration. The future of this country as a great power, its ability to increase production, to maintain our present high standard of living and full employment depend on the right use of our reserves of coal.

THE ELECTRICITY INDUSTRY

The annual report of the British Electricity Authority, issued last week, shows that the Authority earned a surplus of £7,280,823 in the financial year ended March 31, 1953. Compared with five years ago—*i.e.*, at the time of nationalisation—there were at March 31 last some 2,171,000 more consumers being supplied with electricity, bringing the total to nearly 14 mill. Consumption increased in that period by 47%. Capital expenditure incurred last year amounted to nearly £154 mill., an increase of £12 mill. over 1951-52, and at the end of the year on March 31 contractual commitments, in addition to creditors for capital expenditure then outstanding, were estimated at £325 mill., as against a present unused margin of the Authority's £700 mill. statutory borrowing powers of £213 mill. The Authority expects to finance part of these obligations as they mature out of internal resources, but it has made representations to the Ministry of Fuel and Power and the Treasury with a view to obtaining Parliamentary approval for an extension of its present borrowing limit.

The report, comments the *Manchester Guardian*, shows no sign of the B.E.A. accepting that it is but one of a group of fuel and power industries, but every sign that it intends to pursue its aggressive policy of selling more and more electricity to all comers regardless of the cost to the community in real terms. 'There is abundant evidence that all our fuel problems are being intensified by the use of electricity for the wrong purposes. It is becoming urgently necessary to concentrate on using it for the right ones.' The *Financial Times*, on the same aspect, comments that 'there may be some doubt whether current prices reflect any reasonable share of the capital expenditure—from £150 mill. to £160 mill. a year.' On more general grounds the *Financial Times* says that the nationalisation of gas and electricity has so far failed to father the one seemingly obvious offspring—a co-ordinated policy. 'Without this development it is hardly realistic to praise or condemn the policy of either. But if any general conclusions are to be drawn from the latest report of the British Electricity Authority, one is, surely, that, while much is being done by the Authority on its own bat, a good deal more might be achieved by the two together . . . It can be argued—and has been, in more than one authoritative survey of fuel and power—that the relatively low cost of electricity, admirable no doubt in itself, is not ensuring the most economical use of fuel resources as a whole, particularly where the domestic consumer is concerned.' The City Editors of both the *News Chronicle* and the *Manchester Guardian* criticise the Authority's demands for even greater capital extensions in view of the fact that during the year no less than £153 mill., more than one-eighth of the total industrial capital expenditure by manufacturing industry, had been spent.

The increase in electricity sales was in fact (see p. 53) 3.7% over the previous year. Significant figures are the 2.5% increase in industrial consumption and 1.7% for domestic supplies. In regard to this 1.7% figure, the *Electrical Times* talks of 'slackening' . . . 'and the lesson to be learned is the familiar one of domestic development, for, with the loosening of demand from industry, it is to the domestic field we must look to provide the necessary *stabilising element*.' The italics are ours. And now we turn to the *Electrical Review*. Some part at least of the slackening rate of output, our contemporary suggests, is attributable to a 'probably fleeting success of the notorious anti-electricity campaign. It serves as a reminder, however, of the efforts needed to take every advantage of easing of restrictions to restore conditions essential for avoiding increases in the price of electricity to consumers in all classes, since the load factor and plant utilisation factor have been adversely influenced.' We envisage competition. To our way of thinking, the armoury of the gas industry expressed in annual capital expenditure is very weak indeed, in spite of a strong case. Perhaps the truth is that the gas industry does not really desire to progress swiftly and prefers to deal with its revenue and expenditure on the postage-stamp basis.

GOOD LUCK TO N.S.A.S.

Encouraging figures were given in the address at the annual conference of the National Smoke Abatement Society by the President, Professor E. Tylecote, who explained that subscriptions from local authorities to the Society had increased fourteen-fold since 1930. In that year (and this is really astonishing) subscriptions from that source amounted to the munificent sum of £175. In the year ended June 30, 1953, the amount was £2,444. But surely local authorities have not much to boast about this current figure. Relative to the damage wrought by smoke, the figure is in all conscience paltry. In 1930 the average local authority subscription was £2 13s.; now it is £6. Today £6 does not purchase very much more than £3 in 1930. Over the same period of years the subscriptions of individual members, apart from the war years, have

increased slightly, while those of corporate members rose more than those of local authorities. Here are the figures: Year ended June 30, 1930, £363; year ended June 30, 1953, £2,649. This again is hardly exhilarating news. The Society, we learn, has now more than 440 local authority members; in 1929, at the time of the first conference at Buxton, when the two older bodies amalgamated, it had 66. Advancement, admittedly; but how slow everybody concerned with smoke abatement and fuel conservation is to show in practical form appreciation not only of the work of the National Smoke Abatement Society, but of the national economy and the nation's health.

SAFER HOME FIRES

Under the Heating Appliances (Fireguards) Act, which came into force on October 1, some 15 months after receiving the Royal Assent, it is now an offence for any person to sell or hire (except under certain specified circumstances) an electric or gas fire or an oil-burning space heater which is not fitted with a guard conforming to prescribed safety regulations. Manufacturers of gas appliances have been fitting such guards for some time, but the Act applies only to new heating appliances. It does not cover fires already installed in people's homes. It is estimated that there are about 4,500,000 gas and electric fires, and about 12 mill. open solid fuel fires now in use, a large proportion of them without an adequate dress guard, and until something is done about them we cannot expect any large diminution in the number of serious burning accidents. There are now several excellent new designs of guards made for attachment to existing fires at reasonable cost, and they are stocked not only by gas showrooms but by many of the large stores.

The story of the passing of the Bill which made fireguards compulsory was told in Woman's Hour on the radio last week by Mrs. Vera Colebrook, who, with her husband, Dr. Leonard Colebrook, started a campaign for greater safety in regard to domestic fires some nine years ago. Together they planned, wrote letters, addressed meetings, and obtained the co-operation of many organisations and individuals. The measure was introduced as a Private Member's Bill. From time to time during the debate they were sure the Bill would not go through, but they were quite prepared to start their campaign all over again. The battle against the menace of the unguarded fire is only one stage in the fight against the sources of burns, and Dr. and Mrs. Colebrook are now campaigning for the fireproofing of children's inflammable clothing.

NUCLEAR ENERGY

Writing on 'Nuclear Power' in the *Journal of the Institute of Fuel,* Professor J. Rotblat puts forward the view that the factual material available is too meagre to allow any real assessment to be made of the costs of nuclear power, but even if quantitative data were available it would still be almost impossible to predict the consequences of nuclear power on the world economy. Professor Rotblat quotes a few figures 'for what they are worth.' When comparing nuclear with conventional fuels, he points out that one has to consider separately the capital cost of the power station and the cost of fuel. The former is bound to be considerably higher than that of a conventional power station, since the cost of the nuclear reactor is additional to the usual costs of a power station —*i.e.,* boiler, turbine, generator, etc. If we take an average of the various figures quoted, it appears that the capital cost of a nuclear power station will be of the order of £200 per kW installed; the corresponding cost of a conventional power station is about £50 per kW installed.

Turning now to the cost of upkeep, an average figure quoted for the cost of processed uranium metal is about £20,000 per ton. The burning of 1 ton of nuclear fuel, in a plant utilising 25% of the heat produced, would deliver about 5,000 mill. kWh. If therefore the efficiency of utilisation of uranium is about 1% we obtain a cost of nuclear power of about 0.1d. per unit (kWh), which is rather less than the fuel cost in producing electric power from coal. In addition to the cost of fuel there would be some running costs, mainly on the chemical treatment of the fuel elements, to remove the 'ashes' (fission products), and to separate and purify the remaining uranium or plutonium.

Summing up, Professor Rotblat says it seems likely that nuclear power as a by-product will become available on a limited scale in the near future. Its development on a large scale, when it will compete successfully with other forms of energy, will probably take a number of years, but there is every reason to be hopeful that eventually it will be accomplished.

NATIONALISATION OUTLOOK

Both the main political parties are thinking—and talking —a good deal about nationalisation, and the pattern of future policy is becoming clearer. The Labour Party, at its annual conference at Margate last week, rejected by a considerable majority a proposal to include nationalisation of the land in the policy statement *Challenge to Britain.* The conference also rejected amendments which would have widened the policy of nationalisation by including engineering and other industries in the party's proposals. The nationalised industries are among the subjects dealt with in the 212 resolutions to be submitted to the annual conference of the Conservative Party, also at Margate, later this month. The conference will be asked, when dealing with the nationalised industries, to call on the Government to make a careful examination of the industries left under State control in order to cut out waste and extravagance and to provide a better service to the consumer. Points likely to be raised include a suggestion that the Monopolies Commission should have its work extended to cover the nationalised industries, and another that a greater measure of Parliamentary control should be exercised over these industries.

The Gas Act, 1948, under which the gas industry was nationalised in the spring of 1949, was passed by a Labour Government, but it was modelled to a large extent on the recommendations of a Committee of Enquiry appointed by the National Government which went out of office in 1945. It was already commonly agreed that the industry was in need of re-organisation if it was to continue efficiently to meet the needs of its consumers, and apart from the fact that nationalisation was a fundamental principle of the Labour Party there was very little party political strife about the passing or the bringing into operation of the Gas Act. Neither party proposes to disturb the basic principles of the nationalised gas industry, but that is not to say that there will not be a closer scrutiny of its annual reports if and when the new committee proposed in the recent report of the Select Committee on Nationalised Industries is set up. Some of the speakers at the Labour Party conference urged a wider participation of workers in the management of the State industries—a trend only recently reflected in the appointment by the Minister of Fuel and Power of a senior district official of the National Union of General and Municipal Workers as a part-time member of the Northern Gas Board.

A continuous benzole distillation plant is to be built in Gelsenkirschen by the Redestillationsgemeinschaft G.m.b.H. of Bochum. The benzole treated will be that produced by pressure hydrogenation refining from crude benzole at the Scholven works and will be brought to the new plant by pipeline. The new plant will be able to handle up to 15,000 tons of pressure hydrogenated crude a month.

Personal Notes

MISS M. J. BURLAND has been appointed Secretary of the London and Counties Coke Division of the Gas Council. She has been assistant secretary to the Coke Committee since May, 1949. Miss Burland joined the former London and Counties Coke Association 13 years ago and became deputy secretary in January, 1947.

MR. CLAUDE HANDFORTH, Chief Collector and Cashier of Belfast Corporation Gas Department, was presented with a silver salver and a grandmother clock by his colleagues to mark his retirement. The presentation was made by Mr. J. L. Hyslop, Manager of the undertaking, who mentioned that Mr. Handforth had joined the staff in 1905 and had been appointed chief collector and cashier just before the war. Other speakers included Mr. H. C. Guthrie, Mr. R. A. Gracey, Mr. J. McKinley, and Mr. A. Dunlop. Also present was Captain A. Robin, Deputy Manager and Engineer.

MR. F. G. A. DIDDEN, a member of the sales staff of the Parkinson Stove Co., Ltd., who has been progressing through the various departments of the company's Stechford works, has been appointed to their London offices and showrooms at Terminal House, Grosvenor Gardens, as an assistant to the London Sales Manager, Mr. C. T. C. Woodall. Mr. Didden, who was educated at Haileybury College, was commissioned during the war as a lieutenant in the 17/21 Lancers, serving in Greece, Egypt, and Palestine.

MR. H. A. AITKEN, formerly Engineer and General Manager to the Buckhaven and Leven Gas Commissioners, retired on September 30, from the position of Sub-Group Manager, Buckhaven and Leven. Some former assistants who now hold senior appointments and who received their initial training at Leven met Mr. Aitken on September 22 and presented him with a silver coffee tray and crystal wine glasses to mark his retirement and as a memento of their respect and appreciation. The former assistants included Mr. Athol Brown, Deputy Divisional Controller, Northern Division; Mr. R. Clements, South East Division; Mr. T. A. Ross, Sub-Group Manager, Fraserburgh; Mr. A. B. Briggs, District Manager, Buckie; Mr. D. Gillespie, District Manager, Wick; Mr. J. E. Scott, Technical Assistant, Aberdeen; and Mr. Wilfred Brown, Engineer and Manager, West Midlands Gas Board, Leek. The presentation was made by Mr. Athol Brown, who stressed the benefit each had derived from the strict training methods adopted by Mr. Aitken and the appreciation he had imparted for diligent effort, hard work, and loyalty to one's chief. Possibly no other engineer and manager had selected and been responsible for the initial training of so many engineers who ultimately attained managerial rank. In addition to those mentioned, the late Mr. Arthur W. Farquhar had occupied the position of Engineer and Manager at Forfar. Mr. Aitken was President of the North British Association of Gas Managers in 1939.

MR. LEOPOLD FRIEDMAN, London Sales Manager of Easiclene Porcelain-Enamel (1938), Ltd., has left for a two months' tour of the Middle East and the Continent of Africa.

MR. G. DAVIES, Sales and Distribution Superintendent of the Grimsby group of the East Midlands Gas Board, has been appointed Lincolnshire Divisional Sales and Service Manager. He went to Grimsby ten years ago from Perth.

MRS. MARY BRINTON, Mayoress of Kidderminster, was elected President of a new branch of the Women's Gas Federation formed at Kidderminster to co-operate with other organisations in the town working for improvements in home life. Other officers elected were Mrs. W. K. Hall, Chairman, and Mrs. F. Croston, Secretary.

MR. W. E. WHITEN has been appointed Sales and Service Manager to the Nottingham undertaking of the East Midlands Gas Board in succession to MR. EDMUND BATES. He was formerly deputy sales and service manager. A Nottingham man, Mr. Whiten has a total of 28 years with the gas undertaking, and since joining the former Corporation Gas Department as a junior clerk in 1925, he has held various appointments, including showroom manager and industrial representative.

1953 'Journal Directory'

THE following changes have been notified during the past month. To keep the information in the 1953 edition of the *Gas Journal Calendar and Directory* up to date readers are invited to note these alterations (together with the appropriate adjustments relating thereto in the 'Personnel' section of the *Directory*, pp. 141-156):

Page 21.—MINISTRY OF FUEL AND POWER: Delete *Secretary of State for the Co-ordination of Transport, Fuel, and Power*, The Rt. Hon. Lord Leathers, C.H.
Page 29.—EAST MIDLANDS GAS BOARD: Add J. R. Knott, *Marketing Officer*.
Page 37.—EASTERN GAS BOARD: Add E. Walker, M.C., *Part Time Member*.
Page 47.—NORTH EASTERN GAS BOARD: Delete F. S. Charnley, *Deputy Ch.E.*, removed.
Page 73.—NORTHERN GAS BOARD: Add J. G. Morgan, M.B.E., J.P., *Part Time Member*.
Page 109.—LLANDOVERY: J. D. Rees, *M.*, vice W. Spowage, deceased.
Page 115. — WEST MIDLANDS GAS BOARD: Add *Constructional Engineer*, F. S. Charnley.
Page 117.—CRADLEY HEATH: F. W. Sidaway, *Works E. & M.*, vice C. F. Dakin, retired.
Page 118.—STOURBRIDGE: J. A. Tomes, *Works E. & M.*
Page 119.—WARWICKSHIRE DIVISION: Add A. W. Wren, *Div. Coke Officer*; B. G. H. J. Hawkings, *Div. Distributing E.*, vice F. A. C. Pykett.
Page 119.—HINCKLEY: A. B. Britton, *E. & M.*, retired. (The appointment of G. J. Rimmer as his successor has already been announced.)
Page 120.—MALVERN: K. E. Chambers, *E. & M.*
Page 164.—GUERNSEY: S. G. Vane, *E. M. & S.*, vice R. G. Luxon, retired.

Diary

Oct. 9.—SCOTTISH JUNIORS (WESTERN): 'Some Notes on Starting up a Continuous Vertical Retort Plant,' A. F. Cottrell (Woodall Duckham Co., Ltd.), Royal Technical College, Glasgow.

Oct. 9.—LONDON JUNIORS: Opening Meeting. Presidential Address, W. Johnson. 178-180, Edgware Road, W.2. 6.30 p.m.

Oct. 10.—SCOTTISH (EASTERN) JUNIORS: Opening Meeting. Presidential Address, G. Cobb. Dunfermline.

Oct. 10.—INSTITUTION OF CHEMICAL ENGINEERS: Joint meeting of North Western Branch and S.C.I. Chemical Engineering Group, George E. Davis Memorial Lecture, Norman Swindin, Manchester.

Oct. 13.—WALES G.C.C.: Guildhall, Wrexham, 3 p.m.

Oct. 14.—WALES GAS BOARD: Inauguration of Maelor Gasworks, Wrexham, by Lord Lloyd, Under Secretary of State for Welsh Affairs.

Oct. 14.—EASTERN SECTION, I.G.E.: 'Gas Industry Productivity Team Report,' introduced by J. H. Dyde, supported by H. R. Hart; 17, Grosvenor Crescent.

Oct. 14.—INSTITUTION OF HEATING AND VENTILATING ENGINEERS: 'Conservation of Fuel, Heat, and Energy: Report of U.K. Team to U.S.A.,' W. L. Boon, E. G. Ritchie, and L. Copeland Watts; Institution of Mechanical Engineers, Storey's Gate, 6 p.m. Members of the Institution of Gas Engineers are invited to attend and take part in the discussion.

Oct. 17.—MANCHESTER JUNIORS: Annual General Meeting; Presidential Address by J. Oates; Visit to Rochdale Gasworks.

Oct. 17.—WESTERN JUNIORS: Inspection of Basin Gasworks, Exeter, followed by meeting at Exeter Gas Showrooms, 'Some Observations on the Problem of Retort Leakage,' F. R. Rendle (Plymouth), 2 p.m.

Oct. 19.—WEST MIDLANDS G.C.C.: Dudley Room, Queen's Hotel, Birmingham, 2.15 p.m.

Oct. 20.—WALES AND MON. JUNIORS: 'Distribution,' T. L. Thwaite, and visit to British Nylon Spinners, Pontypool.

Oct. 22.—MIDLAND JUNIORS: Visit to Bryan Donkin Co., Ltd., Chesterfield.

Oct. 24.—WALES JUNIORS (NORTH): Inspection of Welded Gasholder and Housing Site, Llangefric.

Oct. 27.—BRITISH ROAD TAR ASSOCIATION: Annual Meeting and Dinner, May Fair Hotel, London.

Oct. 27.—LONDON AND SOUTHERN SECTION, I.G.E.: Annual General meeting; 'An Accountant in the Gas Industry,' L. W. Smith; 17, Grosvenor Crescent, S.W.1, 2.40 p.m.

Oct. 28.—EASTERN JUNIORS: 'Education and Training' and 'Research' Sections of the Gas Industry Productivity Team Report on Visit to U.S.A.; Discussion to be opened by A. G. Higgins, Assistant Secretary, Institution of Gas Engineers, and Dr. A. Marsden, Area Scientist, S.W. Gas Board, Colchester.

Oct. 29.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Oct. 27-30.—Dairy Show, Olympia. Gas Council exhibit.

Oct. 30.—LONDON JUNIORS: 'The Uses of Coal Tar and its Products,' J. R. Dewhurst, PH.D., South Eastern Gas Board; 178-180, Edgware Road, 6.30 p.m.

Manchester and District Section

Visit to Partington Gasworks and Works of Petrochemicals Ltd.

MEMBERS of the Manchester and District Section of the Institution of Gas Engineers assembled at 11.30 p.m. on September 25 at the Partington Gasworks of the Manchester undertaking, North Western Gas Board, and began the day by inspecting the new installation of W-D continuous vertical retorts and the arrangements for the reception of tail gases from the adjacent works of Petrochemicals, Ltd., and its admixture in suitable proportions to producer gas and carburetted water gas.

Carbonising Plant

The W-D plant consists of 32 83 in. retorts. Each retort has a coal capacity of 7 to 8.5 tons per day, according to the calorific value of the gas made. The retorts are set in W-D's well-known lambent heating settings in which, we were informed, the heating gases ascend in a series of horizontal passes with temperatures 1,280°C. to 2,300°C. in the bottom pass. The highest temperature, 1,350°C., is attained in the third and fourth passes.

Heating gas is supplied by two of three Humphreys and Glasgow hot gas mechanical producers using screened coke, 2 in. to 1 in. with a blast saturation temperature of 58°C. and a producer gas temperature of 500-600°C. Fuel consumption ranges from 11 to 15% by weight of coal carbonised according to retort throughput. Waste heat from the settings at 800-850°C. is recovered in horizontal induced draught boilers raising steam at 120-130 ft. per sq. in. Exhaust steam is utilised for steaming the retorts.

A new coal handling plant has been installed, taking coal from the adjacent sidings to mixing plant and from thence to either the W-D plant or the parallel Glover-West plant which was under reconstruction. In connection with the new retort house an extensive and comprehensive coke grading and storing plant is in course of construction. Carbonising plant also includes 180 24 in. by 18 in. by 23 ft. long horizontal retorts by Drakes, heated by cold producer gas generated in three Trefois and five Power Gas producers using fuel from $\frac{3}{4}$ in. to $\frac{1}{16}$ in., the gas being cleaned in Lymm washers, Livesey washers and scrubbers, the latter to be replaced eventually by Dynamic washers and moisture separators.

Tail gases were being received at the rate of 40.000 cu.ft. per hour at a c.v. of 910 B.Th.U. per cu.ft., density 0.5. They can vary over the range 890 (d, 0.48) to 1,450 (d, 0.85) B.Th.U. per cu.ft. They consist of 85% methane, the remainder being hydrogen with negligible sulphur and other impurities. Their calorific value is measured in a Fairweather recorder specially adapted with a normal gas rate one half that of the standard for town gas. In the calorimeter room other instruments show the values of producer gas, carburetted water gas and the mixture (which is regulated by hand) and also the density of the mixture.

The C.W.G. plant by Humphreys and Glasgow with a daily capacity of 6 mill. cu.ft. (in two units, each of 3 mill. cu.ft. per day capacity) is fully automatic with waste heat boilers recovering residual heat from both run and blow gases. We were informed that this plant works during the winter months under base load conditions.

The sulphate plant has been recently converted from the semi-direct to the indirect process. Output is 5 to 7 tons of sulphate per day. Average throughput of liquor is about 1,500 gal. per hour at 1% strength. Phenols are removed from 1,400 gal. of liquor per hour by means of benzole with an efficiency of 90% monohydric phenols.

Luncheon was served to a numerous company of members and visitors in the gasworks canteen. Mr. A. D. Collinge, Chairman of the Section, presided and with him sat Mr. F. S. Inglis, General Manager of Petrochemicals, Ltd., Mr. A. McDonald, immediate past Chairman, Mr. H. Johnston, Vice-Chairman, Mr. J. Wilson, General Manager of the Manchester Group, North Western Gas Board, Colonel W. M. Carr and other past Presidents of the original Association. Apologies for absence were announced from Mr. D. P. Welman, Chairman of the North Western Gas Board, Dr. R. S. Edwards and Mr. G. E. Currier, Chairman and Deputy Chairman of the North Eastern Gas Board.

A Sad Reflection

Mr. Collinge opened the brief proceedings after lunch by welcoming, among other visitors, Mr. H. Maycock of the Wales and Monmouthshire Section. Referring to the coming afternoon's programme he remarked that it was a sad reflection that coal was still rationed to gasworks in the summer months, which would explain the importance attached to the utilisation of tail gases from oil refinery plants. He introduced Mr. Muller (B.Sc., Leeds), formerly on the scientific staff of the Gas Light and Coke Company, now attached to Petrochemicals, who gave a brief description of the processes in operation at their works.

These have already been described to some extent in several papers published in the Technical Press. Very briefly, the raw material is naphtha which is first cracked by the Catarole process in oil fired furnaces into gases and liquids; these are further fractionated and treated in two separate streams and sequences of plant. Mainly ethylene and propylene are separated out and the tail gases, methane and hydrogen, are fed to Partington gasworks. In both streams a bewildering range of compounds is produced for use in the chemical industry. Petrochemicals were first in the field in Europe with several of these, saving many dollars to the sterling area.

The steam, heat, and power supplies to these plants, one of the most interesting features of the works, have already been described in the Technical Press. The several processes require a wide range of temperatures from well below zero to combustion temperatures. Intermediate temperatures are within the range of steam. Steam is raised in water tube boilers fired by liquid fuel at 600 lb. per sq. in. and 300°C., leaving pass-out turbines at 160 lb. per sq. in. and 180°C. Pumps and compressors exhaust at 20 lb. per sq. in., say, 130°C.; the steam is used for process work and most of the condensate is returned to the boilers. Heat economy is very highly developed, both high and low temperature plants being heavily insulated.

150 Acres of Plant

The works is a remarkable achievement. Naphtha was first fed to it six years ago; many of the processes have been put straight into production from laboratory data. The plant already built occupies 150 acres of an area of 800 acres which is to be devoted to the chemical industry.

Tea was served at the Petrochemical Works after which Mr. H. Johnston proposed and Mr. W. S. Hubbard seconded a vote of thanks to the North Western Gas Board and Mr. J. Wilson and his staff of the Manchester Group and to the Chairman and Directors of Petrochemicals, Ltd., and their staff. Mr. J. Wilson and Mr. F. S. Inglis responded.

Denton Gasworks Progress

CONSTRUCTION of a fully-mechanised gasworks at Denton, Cheshire, which when completed will feed its surplus self-produced electric power into the British Electricity Authority's national grid, is now, says the North Western Gas Board, well past the half-way mark.

Designed to produce 16 mill. cu.ft. of gas daily, the works will be one of the six largest in the North West and will be power-operated by electricity made from its own waste heat, thus fulfilling one of the chief recommendations of the British Productivity Council in its recently published report on national fuel saving.

Once the works is in full operation, it will send its gas into the Board's high pressure grid which links the greater Manchester area. Its capacity of 16 mill. cu.ft. will be made up of 12 mill. cu.ft. of coal gas and 4 mill. cu.ft. of carburetted water gas. The water gas plant is already in action, sending out gas under pressure to supplement production at the Board's gasworks at Stockport and Partington.

The almost completed coke handling plant at the new works will be the largest in the North West and one of the largest in the country. It will be capable of screening 85 tons of coke an hour, of storing 1,000 tons, and filling 4,000 bags of sized coke each day for sale to domestic users.

The Mayor of Canterbury, Alderman H. B. Dawton, was presented with a silver key by Mr. R. S. Johnson, Deputy Chairman of the South Eastern Gas Board, at the opening of the new Gas Board showrooms in Canterbury High Street on September 14. Alderman Dawton complimented the Board on having designed a modern showroom which succeeded in blending with the charm of the famous High Street.

The Advancement of Science

A few extracts from papers contributed to the 1953 meeting at Liverpool of the British Association for the Advancement of Science

MR. A. E. MARGOLIS discussed 'District Heating.' In his survey of this field, in which he is an acknowledged expert, he commented that in the light of the advance of science and engineering the low standard of our conventional methods of heating is difficult to understand and can only be deplored. The predominant method of heating in this country is still by means of open fires as it was 100 years ago, with all the well-known results of pollution of the air and blackening of our towns and cities, but with a very poor efficiency in coal utilisation.

The direct and indirect damages caused by smoke, continued the author, has been estimated by Dr. A. Parker, Director of the Fuel Research Station of the D.S.I.R., at £50 mill. annually. The use of gas and electric fires cannot, Mr. Margolis contended, be more than a palliative on the heating problem on a nation-wide scale because these methods of heating are both too expensive for the great masses of people and too wasteful in fuel consumption. Here is his argument.

The average thermal efficiency of all steam operated electricity power stations of the B.E.A. was, in 1952, 22%. It is hoped that it would be increased up to 1960 to 26%. The average thermal efficiency of open fires might also be taken at 22%-26%. By co-ordination of electricity and heat generation with district heating, however, the thermal efficiency can be increased up to 80%-85% and the present great waste of coal substantially eliminated and the cost of heat and electricity reduced. According to the Ridley Report it appears that without drastic measures a fuel catastrophe can hardly be avoided.

[It would seem that Mr. Margolis does not suffer from a 'hope complex.'—Ed., *G.J.*]

In Hamburg the author initiated district heating in 1921. Up to 1929 three old condensing stations had been converted for district heating and the heat distribution system connected to a comparatively modern power station located outside the built-up area of Hamburg. The plants were severely damaged by heavy air raids in 1942 and the heat output of the stations was further reduced by shortage of fuel. Meanwhile, most of the damaged buildings have been restored and the heat output of the stations, including the new heat-electric station at Hamburg, rose in the last year up to 34 mill. therms.

The great popularity of district heating in Hamburg, continued the author, is demonstrated by the fact that last year the total new load on the hot water system in Hamburg amounted to 80 mill. B.Th.U. per hour, approximately as much as the total load of the Pimlico district heating undertaking when fully developed. The remarkable fact is, he said, that the capital costs required for the distribution mains, including connections and all apparatus in the buildings, are met by the consumers.

The Pimlico Scheme

The Pimlico district heating scheme, Westminster, he added, incorporates the advanced engineering methods of heat-electric generation and heat distribution. It is now in operation with about half of the final heating load and it is working completely satisfactorily. The main feature of the plant is a hot water accumulator for balancing the heating and electricity loads. It facilitates heat-electric generation by meeting the variable requirements of electricity generation and heat supply.

To quote from what Mr. Margolis had to say, the useful heat storage capacity of a hot water accumulator is about 5,000 B.Th.U. per cu.ft. For the storage of the useful heat with town gas the volume of a gasholder is about 20 times as great as that of a hot water accumulator. The annual heat losses of the Pimlico accumulator have been estimated and confirmed by tests at less than 1% of the annual heat consumption. The capital costs of large capacity hot water accumulators do not exceed the cost of cooling towers of condensing stations, but whereas the heat of the exhaust steam of a condensing station is lost with the cooling water, the stored heat in the hot water accumulator is used with an efficiency of 99%.

The serious situation of our fuel position will sooner or later enforce the development of district heating also in this country. Apart from saving of vast quantities of coal, this development would eliminate the smoke nuisance, decrease the frequency and intensity of fogs, and facilitate the task of future town planning.

The paper finished with a statement that by scientific development of heat-electric generation an annual saving of 20 mill. tons of coal might be attained.

Punched Cards

There was a paper on 'Punched Cards,' by A. YOUNG, in which he said that the records of scientific research were so vast and were accumulating so rapidly that further progress was in danger of being delayed if scientists failed to solve the problem of making the results of research readily available. This was essentially a problem of documentation, which had its counterpart in the spheres of industry and commerce.

Punched-card machine systems, which were originally invented to meet the needs of the statistical analysis of census data, were extensively developed because they were found to be capable of solving the problems of administration in large-scale accounting. Modern punched-card equipment was characterised by its extreme reliability, its capability of performing simple repetitive calculations at speed, its capacity to analyse vast amounts of data economically, and its flexibility in application. It was limited in use only because many operations of an identical nature were required to be performed before the economical use of the machines was ensured.

Where the volume of work did not justify the use of punched-card machine installations, the use of edge punched card index systems for collating and analysing data was often possible. Cards of this nature were sorted by means of holes around the edges which might be slotted according to pre-arranged codes. Edge-punched card indexes had been found to be admirably suited for the purposes of the bibliographical classification of research papers and similar tasks and went far towards solving many of the problems of scientific documentation.

In the field of scientific computation special punched-card machines were available which were more versatile than those yet in general commercial use.

More About the Calculating Machine

The foregoing comments were contributed to the Mathematics Section at the meeting. In the same Section came a paper by Professor L. ROSENHEAD, F.R.S., who suggested that public interest in machinery for calculation had been aroused by names such as 'mechanical brains' and 'electronic brains,' etc., which had appeared in the popular Press. Further mystification had been created by statements that these devices thought, used judgment, and played games.

The lecture by Professor Rosenhead put these statements into perspective and showed that these new devices do not contain any new principles of design, but that they do embody the refinement and elaboration of known techniques. They were aids to computation and the principal features of the most modern machines were: They were digital, that is, they carry out their operations on discrete objects which represented numbers; they were fully automatic—*i.e.*, once the initial instructions had been formulated and programmed, the machines carried out their tasks without further human intervention. They were electronic—*i.e.*, electronic valves were used in their design. They carried out calculations with a speed and reliability quite impossible in human computers. They were multi-purpose—*i.e.*, they could be used for the solution of a wide variety of mathematical problems. Where the machines appeared to 'think' or 'use judgment,' the criteria for the judgment had to be thought out by the operators and embodied in the machines.

In Professor Rosenhead's lecture a brief review was made of the social, including commercial, administrative, and scientific, needs of the present time to show that the desire for speed in computation was not just a passing whim. It expressed a need based on a realisation of what was happening in society. The ability to make the machines was tribute to the skills of the mathematician, the engineer, and the inventor. But a healthy society must contain not only people of brilliant inventive minds, but also those who had the wisdom to see the potentialities of these machines, to help in their development, and to use them.

The author indicated what were likely to be the future developments in this field: The creation of simpler, less expensive, machines; a growing use of numerical analysis, as distinct from mathematical analysis, in the solution of problems of pure and applied science; the solution of many problems of applied science hitherto considered to be impossible on account of the difficulty of the purely mathematical approach, or on account of the excessive labour involved in numerical solutions based on the use of human computers; and the revitalisation of many branches of applied science.

The Building Research Station of the D.S.I.R. dealt with the Measurement of the Efficiency of Heating in Buildings. Most of the known facts, as well as most of the possible opinions concerning the efficient use of fuel in this country, it was reported, were given in the report of the Committee on National Fuel Policy (the Ridley Committee). The subject was now so thorny and complex that no account of the general problem of fuel economy could usefully be given on a small scale. One important interest of the engineer and scientist lay in the reduction of the area of opinion and the increase in factual knowledge. This had been attempted in a series of detailed experimental researches on the heating of buildings carried out at the Building Research Station since 1946. The work on small houses had been carried out in 44 houses built on the Station's experimental site at Abbots Langley in Hertfordshire, and had subsequently been generalised by work in collaboration with local authorities and by survey techniques. Subsequent work had been concerned with the heating of schools and factories, and an experimental assessment of the efficiency of a small district heating plant for houses had been carried out.

In all this work the essential condition had been that the buildings should be normally occupied. The results obtained related to the way in which ordinary families lived in the typical small local authority houses built since the war, and similar results for normal use had been obtained in schools and factories. This had been effected by the extensive use of recording instruments. In the experimental houses the temperature in each room had been continuously recorded by day and night for over four years in some instances, using a system of multicore cables connecting the thermometers in the houses to central recording stations. The ventilation rate had been measured from outside the houses by the use of helium as a tracer gas, detection being carried out by thermal conductivity bridges. The heat intake had been calculated in terms of the solid fuel delivered, and the electricity or gas had been metered.

The Back Boiler

This work had led to the rehabilitation of the open fire in an improved version and fitted with a back boiler, as the recommended heating system for small houses. Similar measuring techniques had been used in factories and also in schools. By arrangement with the Hertfordshire County Council a new primary school near the Station had been designed to have two classrooms heated by forced warm air, two by floor heating, and two by conventional radiators, and the amount of heat used by these three different types of heating equipment was measured in relation to the temperatures, temperature gradients, ventilation rates, and air currents in the classrooms. The results showed a substantial fuel economy with the warm air method of heating in schools with conventional operation of the systems. They served, however, to emphasise the essential feature of fuel economy—namely, that the heat service must be related to the needs of the occupants. Schools were occupied for only about 20% of the time, so the economy with a very flexible system like warm-air heating was readily understandable, and research was now proceeding on the control systems for radiator and floor heating in order to increase their flexibility.

Institute of Fuel

Programme for 1953-1954

THE Institute of Fuel is to be much concerned during the coming winter session with fuel policy, present and future. In London Dr. F. M. H. Taylor is to speak on 'A National Fuel Policy,' the Yorkshire Section is to be addressed by G. Nabarro, M.P., on 'Aspects of a National Fuel Policy' and the East Midlands Section by W. C. Moss on 'The Ridley Report, the Coal Utilisation Council, and the Public.' Allied to these are 'The Problem of Fuel Economy' by F. C. Ashen at the Midlands Section and 'National Fuel Resources and their Utilisation' by Dr. A. Parker at the Western. For the future there is to be Professor F. E. Simon on 'The Future of our Power Supplies' at the East Midlands, 'Solar Energy for Water and Space-heating' (we presume also in the future) by Dr. H. Heywood in London and R. V. Moore on 'Atomic Energy' at the North Eastern, while Dr. Bronowski is to address the April annual meeting of the North Western Section on 'Energy in the Future.'

Coal specifically is to be dealt with in 'The Coal Problem' by D. Hicks at the East Midlands, 'Plotting the Properties of the Coal Reserves' by A. M. Wardless at the North Eastern, 'Coal Science in Industry' by Dr. D. T. A. Townend (E. Mid.), 'The Fine Crushing of Coal' by Dr. J. Taylor (Scottish), 'The Development Programme of the N.C.B. in the West Midlands,' R. W. Scurfield (Mid.), while Scotland is discussing 'Coal Supplies in the Scottish Coalfields' (J. W. Anderson), 'The Future of the Coal Mining Industry in Scotland' by H. R. King and 'Underground Gasification' by C. A. Masterman at the Chester meeting of the N.W Section.

Coke features in 'New Coking Processes' by D. T. Barritt and T. Kennaway and 'Carbonisation of Blends of Coal to produce Metallurgical Coke' by H. Bardgett in London. Mr. Bardgett is also addressing the E. Mid. Section on 'Some Effects of Carbonising Conditions in Coke Combustibility,' while F. V. M. Boll is describing the 'Extensions at Llandarcy' in S. Wales.

Coal technology is represented in a number of papers: Dr. F. J. Dent on the 'Total Gasification of Coal' in S. Wales, J. Brown on the 'Calorific Value of Coal' in the North East, M. J. McInerney on 'Flow Patterns in Furnaces' at the Midlands Section, C. M. Auty on 'High Temperature Heating Fluids' in Scotland, G. Nonhebel in the North West on the 'Work of a Central Fuel Technology Department,' R. S. Medlock in the N.W. on 'Oxygen Analysis.' Professor M. W. Thring in Scotland on 'Flame Propagation and Radiation,' and 'Fuel Technology in France' by J. Couture in London.

Waste heat recovery is represented by C. Ungood in the Midlands on 'Waste Heat Recovery for Steam Raising,' G. L. Duffett (N.E.) on 'Waste Heat Recovery by Turbines,' S. J. Eardley (Yorks.) on the 'Recovery of Waste (Rejected) Heat in Industry,' and 'Refractory Recuperators' by F. H. Cass, Dr. N. L. Franklin, and Professor A. L. Roberts in London.

Smoke abatement is covered by a paper by G. W. Farquharson in the programme of the Midlands Section; atmospheric pollution by Dr. A. C. Monkhouse in the N.W., and Dr. S. I. A. Laidlow in Scotland, and the 'Modern Approach to Smoke Abatement' by A. Marsh also in the North West.

Other papers are 'Fuel Oil and Oil Firing' by G. J. Gollin in Yorks., 'The Development of the Electrical Industry' in S. Wales by H. J. Bennett, 'The Festival Hall Heat Pump' by P. E. Montagnon in London, 'Industrial Drying, particularly in the Paint and Foundry Industries' by A. M. Lohmann in the Midlands, 'Problems of Boiler Water Treatment at Medium and High Pressures' by C. W. Drane also in the Midlands, 'Insulation of Industrial and other large Buildings' by H. G. Goddard in S. Wales, 'Hot Blast Cupola Practice' by W. J. Driscoll in Yorks., and, finally, a paper on the 'New Education Scheme of the Institute' by Dr. D. T. A. Townend.

Conference on Complete Gasification

To study the processes of gasification and the inherent problems the Institut National de l'Industrie Charbonnière (Inichar) is calling together technicians and research workers from all over the world. An international conference on complete gasification of coal will be held at Liege from May 3 to 8, 1954, during the yearly International Fair 'Mines — Métallurgie — Mécanique — Electricité industrielle' an important part of which will be devoted to gasification. The meetings will be followed by visits to the principal gasification plants of Western Europe.

Reports (which should be sent to Inichar, Boulevard Frère Orban, Liège 7, before January 1, 1954) will be reproduced in three languages, French, English, and German by Inichar and will be sent, before the conference, to those taking part. During the conference there will be discussions in the three languages with simultaneous interpreting.

The cost of participation in the congress, including publications, entrance to the exhibition, and participation in the various activities is 350 Belgian francs; this sum does not include the cost of excursions, which will be fixed later.

With the object of facilitating the arrangements, Inichar requests those likely to take part in the congress to forward their application to the address given above.

Air Pollution.—The first autumn lecture of the 41st annual series of Chadwick Public Lectures, organised by the Chadwick Trust, will be given at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2., on Thursday, October 15, at 5.30 p.m. The subject will be 'Air Pollution' and the lecturer, C. J. Regan, B.SC., F.R.I.C., Chemist-in-Chief of the London County Council. The Chair will be taken by Dr. R. Lessing, a Chadwick Trustee. Both the lecturer and the Chairman are members of the Government Committee on Air Pollution. Admission to all Chadwick Public Lectures is free, and any person desiring to be supplied with the programme of the series should send a postcard to the Clerk to the Chadwick Trust, 204, Abbey House, Westminster, London, S.W.1.

The London Fog Disaster*

By J. A. SCOTT, O.B.E., M.D., M.R.C.P.,
Medical Officer of Health, London County Council

IN its interim report (June, 1920, Cmd. 755) the Departmental Committee on Smoke and Noxious Vapours Abatement stated:—

Damage to health.—We have received evidence with regard to the damage done to the health of the community by a smoke-laden atmosphere, and are satisfied that smoke has a serious effect on the general health.

Statistical evidence shows a close relation between the death-rate and the atmospheric conditions; the number of deaths from pulmonary and cardiac diseases is shown to increase in direct proportion to an increase in the intensity and duration of smoke fogs. The cause underlying the high mortality in towns, which is known to follow in the wake of a fog, must operate continuously, though to a lesser degree, on the health of an urban community.

From December 5 to 8, 1952, inclusive, London experienced an intense fog which sadly illustrated the validity of the conclusions reached officially 33 years earlier. This period was marked, meteorologically by almost complete absence of air movement and by low temperature, with the consequent arrest of the normal upward air circulation by convection currents. Hence smoke, sulphur oxides, and other air contaminants increased to concentrations much above those for the normal winter season.

Sharp Rise in Pollution

The following figures are drawn from recordings at Kew Observatory. Average daily summer figures (June) for smoke are about 0.12 milligrammes per cu. m. of air and of sulphur dioxide 0.07 parts per million. The sharp rise in pollution which accompanied the fog led to maximum figures on Sunday-Monday, December 8, of 4.46 milligrammes per cu. m. of smoke and 1.339 parts per million of sulphur dioxide. The mean daily temperature during the period December 5-8, was also some 12°F below the eighty year average.

The deaths registered week by week from November 16, 1952, to January 10, 1953, in the Administrative County of London were as follows:

Week ending	Total number of deaths registered during the week
November 22, 1952	753
November 29, 1952	853
December 6, 1952	945
December 13, 1952	2,484
December 20, 1952	1,523
December 27, 1952	1,029
January 3, 1953	1,372
January 10, 1953	1,216

Up to the week ending December 6 these deaths were running at the normal winter average, which on occasion rises as high as 1,100. The following week reveals a dramatic increase which can only be attributed to the effects of the fog—indeed, none of the deaths shown above can be attributed to the influenza epidemic which manifested itself in London later in January, 1953.

TABLE I.—*Deaths per million inhabitants in London during certain specified weeks*

Week ending	Aug. 4, 1866 (*Cholera*)	Dec. 20, 1873 (*Fog*)	Nov. 9, 1918 (*Influenza*)	Dec. 13, 1952 (*Fog*)
Deaths registered	876	713	1,085	745
Normal number for period and season	450	470	300	300
Excess of deaths over normal	426	243	785	445

Comparisons in a catastrophe of this magnitude are inevitable and indeed salutary. Table 1 illustrates the peak fatality week of certain epidemiological events in London's earlier history as compared with that of the 1952 fog.

The December fog can reasonably be said, therefore, to be the direct cause of 1,500 deaths in the Administrative County, and Logan[1] in a notable paper showed that in the 8½ mill. population of Greater London it caused 4,000 deaths. 'Smog' in the Meuse Valley in 1930 caused 64 deaths and in Donora (Pennsylvania) in 1948, 20 deaths.

Analysis of the deaths in the Administrative County of London show that every age group was affected though not unexpectedly the very young and the old were the most hard-hit. Among children aged four weeks to one year and among persons over 55, three times as many deaths were registered in the week ended December 13 as the average of the previous three weeks; in the other age groups the number was doubled. Deaths from bronchitis were 10 times as many, from 'influenza' seven times, from pneumonia five times, from tuberculosis four-and-half times, and from other respiratory diseases nearly six times. The fog was a critical event for those suffering from cancer of the lung, nearly twice the average number dying. Damaged hearts could not cope with the increased respiratory embarrassment and nearly three times the average number of deaths occurred from disorders of the heart and circulatory system. Gastro-enteritis deaths among children under one year old increased considerably —it seems likely in the circumstances that this event was secondary to an infection of the upper respiratory tract—otherwise, there was no significant increase in deaths from any other defined cause.

Effect on Healthy Cattle

This episode coincided with the Smithfield cattle show, as, by a coincidence, the 1873 fog did also. In both instances otherwise healthy cattle died or had to be slaughtered. About a third of the animals had to be removed. Both in human beings and in animals the noxious effects were strikingly rapid; Logan[2] has pointed out the rapidity with which lethal events accompanied not only this London fog but also those of 1873, 1880, 1892, and 1948.

What elements in an urban fog cause such striking and speedy fatalities? Despite the many studies, of which that of the Donora episode[3] is an excellent example, it does not at present seem possible to implicate any single factor among the many products of incomplete combustion. Particulate matter, sulphur compounds, tarry constituents, and fluorides have all been implicated. Because of their demonstrable effect on the fabric of buildings, the annual cost of which has often been estimated, sulphur products (2.3 mill. tons poured into the atmosphere of Great Britain each year) have come under most suspicion. But those who experienced the oily greasy film which covered furniture, property, and persons in the December fog, and which replaced itself inside houses within an hour of being cleaned away, will not be surprised at recent speculations that the various factors may be cumulative in their effect. A cutting from *The Chemical and Engineering News* of June 29, 1953, sent to me by Dr. Mary Amdur of Harvard, has a brief account of recent experimental work which seems highly relevant:

'From smog and aerosol research comes what has been called a "fantastically dramatic death" in four seconds. Ordinarily non-toxic gases like SO_3 and SO_2, which dissolve in the nasal passages, when carried to the lungs on an aerosol show high toxicity comparable to or greater than HCN in some cases. One such gas-aerosol combination immediately produces purple haemorrhage and clotting on reaching the lungs of test animals. Data indicate that an aerosol acts as a synergist carrying soluble gas, which once in the lungs, is more toxic than originally believed .... 70% of gas-aerosol combinations tested are more toxic than they are individually, and in some cases non-

* From a paper at the annual conference of the National Smoke Abatement Society, Glasgow.

toxics become toxic when they are carried by an aerosol.'

Despite the immense amount of work already done, therefore, it becomes clear that a great problem faces the Committee on Air Pollution recently appointed by the Ministers of Housing and Local Government and of Fuel and Power and by the Secretary of State for Scotland. The proper discharge of their terms of reference may also involve experimental work with artificial fogs. But in the interval there is much that can be done by the ordinary citizen and by industry. The proper use of smokeless fuels in domestic grates, the abolition of abominations like 'nutty slack,' the discharge of industrial smoke effluents from chimneys at the proper height, even the cessation of industrial activity (as is now practised in many parts of America) when a fog seems likely—all this does not await the results of further research. The ordinary man in the street and the ordinary factory and office can do much to lighten Evelyn's 300-year-old condemnation of the 'hellish and dismal cloud of sea-coal which maketh the City of London resemble the suburbs of Hell.' The North Sea floods aroused the practical sympathy of the country as such disasters always do. The London fog cost many more lives and an untold amount of invalidity. It is time the country moved.

References

[1] LOGAN: 'Mortality in the London Fog Incident', *The Lancet*, 1953, i, p. 336.
[2] LOGAN: *loc. cit.*
[3] 'Air Pollution in Donora, Pa.'—Public Health Bulletin No. 306, Federal Security Agency, U.S. Public Health Service, 1949.

THE NATION'S ENEMY

THE great 'smog' of last December, with its death roll of thousands, pointed the lesson that this country can no longer afford to pour into the air, in the harmful form of smoke, a large proportion of its valuable fuel.

An exhibition on Smoke and Smog—Causes, Effects, Prevention, opens on November 9, for four weeks, at the Museum of Hygiene of the Royal Sanitary Institute, 90, Buckingham Palace Road, London, S.W.1, a body devoted to promoting the health of the people.

This exhibition will demonstrate how needless smoke is produced; what smoke does, especially when meteorological conditions favour the formation of 'smog'; and how smoke can be reduced and the pollution of the atmosphere prevented. In staging this important exhibition, the Royal Sanitary Institute has the active collaboration of Government Departments, such as the Fuel Research Station, the Meteorological Office, the Building Research Station, and the Ministry of Agriculture and Fisheries; as well as the London County Council, the British Iron and Steel Research Association, the National Smoke Abatement Society, the Solid Smokeless Fuels Federation, etc.

Admission to the exhibition is free, and all interested in the fight against smoke are welcome. The Institute's premises are close to Victoria Station, and the exhibition will be open from 10 a.m. to 5 p.m. on Mondays to Fridays and from 10 a.m. to 12 noon on Saturdays.

MARKING OF CONTAINERS

THE Association of British Chemical Manufacturers has published a booklet entitled *Marking Containers* which outlines a system for warning labels for containers of hazardous chemicals. In recent years there has been discussion both in this country and internationally on the problems relating to warning labels, and this publication has been prepared after detailed consultations over several years. Many chemicals present no special hazards in normal use, but the increasing use of chemicals for new and varied purposes has emphasised the need to warn handlers and users that some products need special care; information regarding the properties of products and the action desirable in the event of a leakage of the contents of a package may be helpful also to carriers.

The object of the Association's scheme for warning labels is to safeguard all concerned, including merchants, ultimate users or carriers, in the home trade from the personal hazards involved in the handling of hazardous chemical products, up to and including the time the container is opened for use in the premises of the recipient. It is limited to trade in this country.

The booklet sets forth general principles for the preparation of warning labels and recommends specimen wording for a number of chemicals. The principles include a description of the legal position, a series of recommended standard phrases, and a detailed specification for the layout of the label. Specimen wording is given for over 200 chemicals together with an index to the most common synonyms. The scheme has been approved by the Council of the Association and recommended for adoption by all members. The Chief Inspector of Factories has congratulated the Association on the scheme and also recommends it for adoption as a code of practice by manufacturers. Copies of the booklet can be obtained from the Association at 166, Piccadilly, London, W.1, price 7s. 6d. net, post free (cash with order).

SCOTTISH ASSOCIATION: THE SOCIAL SIDE

The Scottish Association of Gas Managers is second to none among organisations of gas engineers and managers in recognising the value of the social and recreational side of its half-yearly meetings. In these happy snapshots our Northern Manager has caught the spirit as well as the picture of what happened outside the conference rooms on the occasion of the 92nd annual meeting at Edinburgh on September 24. On the left W. M. Gledhill, E. West and J.S. Smith are seen chatting in the Princes Street Gardens after the taking of the group photograph. In the centre is Mrs. R. Cowie, wife of the President, before presenting the prizes for the bowling tournament. Her husband is with her, and guarding the prizes is John Ford. On the right the bowling contest is seen in progress on the Granton gasworks bowling green. Sir Andrew Clow, Chairman of the Scottish Gas Board, in light jacket, is standing on the green.

POLYVINYL CHLORIDE FOR PIPE PROTECTION

The following extract is from a recent contribution to the *American Gas Journal* by G. M. Carter, of the Minnesota Valley Natural Gas Co., and T. J. Skotnicki, of the Minnesota Mining and Manufacturing Co. The contribution puts forward the claim that polyvinyl chloride tape is next door to the ideal material for pipe protection.

IN this article the authors first of all summarise, under a dozen headings, the characteristics that an ideal pipe protection material would possess. We give them here from the paper in question.

1. The material must adhere tenaciously to the pipe.
2. It should be non-absorbent and impervious to water, moisture vapour, etc.
3. It should possess good dielectric qualities.
4. It should be completely resistant to mineral acids, alkalis, salts, petroleum oils, and refined products such as gasoline and naphtha.
5. It should remain flexible at all temperatures.
6. Soil stress and pipe movement should not affect it.
7. Application should be simple, without unwieldy equipment, and preferably without heat and primer.
8. It should resist penetration by stones, wires, welding rod scraps, and other sharp materials found in the ditches and backfill.
9. It should be able to withstand rough handling without damage.
10. It should be quick setting and fast drying.
11. It should provide permanent protection to the pipe, yet not be prohibitive in cost.
12. The coating must be resistant and impervious to micro-organism attack.

As a general statement, the authors continue, it might be said that any such pipe-protection material must protect the metal against electrolytic corrosion, galvanic corrosion, bacterial corrosion, and chemical attack. No single material available today is able to meet all the requirements completely. However, it has been the experience of the authors that polyvinyl chloride tapes have most nearly met the points.

In the manufacture of polyvinyl chloride tapes, the material is compounded with plasticisers and stabilisers. These are chosen for maximum resistance to the action of micro-organisms, acids, alkalis, water, organic solvents, and sunlight, yet with consideration for the desirable physical properties.

The laboratories of the Minnesota Mining and Manufacturing Co., and other independent investigators, have found that polyvinyl chloride in its pure form is not subject to attack by micro-organisms; however, in several instances, compounded materials containing polyvinyl chloride have been attacked. In most of these instances the attack has been traced almost directly to the compounding ingredients, particularly the plasticisers.

The plasticisers that are particularly subject to attack by various micro-organisms are in general those derived from natural oils and fats—particularly cotton seed, coconut, and castor oils.

The polyvinyl chloride tapes made by the 3M Co., used in the tests and applications—'Scotchwrap' No. 50 and 'Scotchwrap' No. 51—do not contain plasticisers of this type. Once the polyvinyl chloride material has been compounded, it is calendared to an impermeable film and coated on one side with a pressure-sensitive adhesive.

Properties of Polyvinyl Chloride

The variety of desirable properties possessed by polyvinyl chloride lead to a number of uses that will serve to demonstrate them.

1. *Low water absorption:* Shower curtains, raincoats, waterproof bags, inflated toys.
2. *Good dielectric properties:* House wiring, automobile ignition harnesses.
3. *Resistance to oils, acids, alkalis, and other chemicals:* Chemical resistant paints, tubing, and pipes.
4. *Abrasion resistance:* Shoe soles, belting, floor tile.
5. *Toughness and flexibility:* Artificial leather, seat covers, non-inflammable upholstery.
6. *Resistance to micro-organism attack:* Direct burial electrical cable.

Standard testing procedures for these tapes are described in ASTM designation D—1,000—48T.

The tensile strength of the tapes is 25 to 60 lbs. per in. of width. As the values indicate, the tape does not easily break while being applied as a pipe wrap. In addition, since the stretch characteristics are good—175% to 250%—this material yields under soil stress without rupturing, when used for pipe protection.

Another important point is adhesion. In testing adhesion qualities, a 1 in. wide sample is rolled on a polished steel surface held in the fixed jaws of a machine. One end of the tape sample is turned back 180 degrees on itself, and this turned-back end is put in the movable set of jaws. The required pull to peel back the tape from the polished surface is recorded. Adhesion of the tape, so measured, is 20 to 25 oz. per in. of width. This test essentially measures the adhesion force of a line across the tape width; adhesions of actual tape areas are several to many times greater. This property is desirable in pipe protection to ensure a close bond with the protected metal and to inhibit the tendency of the force exerted by corrosion products to separate the protective coating from the pipe.

Dielectric strength is measured by placing one thickness of the tape between the ends of two cylindrical electrodes a ¼ in. in diameter and applying an a.c. voltage which is increased at the rate of 500 volts per sec. The equipment automatically shuts down when failure occurs and a voltmeter indicates the highest root mean square voltage attained. The dielectric strength of the tapes is 1,000 volts per mil. of thickness.

This test is significant in that it indicates the tape's ability to protect underground pipe from stray current electrolytic corrosion caused by faults in the return circuit of electric railways. Also, this property is desirable as protection for the covering itself against nearby lightning strokes, grounded high voltage cables, and similar faults, which once having punctured the covering, leave the pipe open to subsequent galvanic corrosion.

Insulation Resistance

The insulation resistance of the tape is measured by applying a d.c. voltage across two electrodes 1 in. apart, holding a 1 in. width of the tape. The measurement is made while the test assembly is, and has been, in an atmosphere of 96% relative humidity for 18 hours. The insulation resistance of these tapes is 200,000 megohms, or 200,000 mill. ohms. This quality is extremely significant in a pipe-covering because it indicates the ability of the covering to prevent galvanic and electrolytic corrosion.

To measure moisture vapour transmission, an open dish containing calcium chloride is covered with the polyvinyl chloride tape. After the sample has been conditioned, the dish is put into a humid atmosphere. After a given time, the dish is weighed, and the amount of moisture that has transferred through the tape and has been absorbed by the calcium chloride is determined. The moisture vapour transmission of these tapes is 1.21 to 1.55 gramme per 100 sq. in. per 24 hours.

This quality is important in the consideration of a pipe-covering material since under ordinary conditions, moisture is required to corrode iron. Also, most micro-organisms require moisture for their life processes.

On mill-wrapped pipe that has been double jointed by welding or has welded sections, the first step is to peel back the kraft paper 6 in. to 8 in. beyond the usable edge of the mill wrap coating, which has been previously cut back to facilitate welding operations.

Next the mill wrap coating should be feather edged, and the surface of the mill wrap—exposed after the peel-back of the kraft paper—should be wire brushed to present a roughened surface. The surface of the pipe to be wrapped with polyvinyl chloride tape should be cleaned free of rust, welding slag, dirt, grease, oil, soap suds, moisture, and other foreign matter. All sharp irregularities that might have resulted from the welding operation should be flattened. Loose mill scale, dirt, and rust, should be removed by wire brushing or scraping.

Oil and grease must be removed by wiping with clean rags dipped in a solvent. The rags used for wiping should be discarded at intervals so that no appreciable amount of oil or grease can collect.

The first application of the tape is over the welder's date and initials. The next application is two layers of tape around the welding bead. The main wraps of tape can be applied either by starting at one end and working across and back, or by starting at the weld, wrapping to one end and back to the other end, and then back to the weld again. Both methods provide a double wrap.

It is important that the tape wrapping should either butt the end of the kraft paper wrap or a small space should be left exposed between the tape and the kraft paper. The kraft paper gives no protection other than a visual indication of damage to the mill wrapped coating.

In all these applications, the tape should be applied with no more stretch than is imparted to it by unwrapping it from a freely-rotating roll. The last turn, however, should be applied with no tension or stretch whatsoever. This is done by unrolling enough tape for the last turn and then cutting off the remaining part of the roll, allowing the tape to relax to its unstretched length before applying. This prevents any tendency to creep due to over-stretching.

Here are certain of the recommendations and observations by Minneapolis Gas Co. regarding use of the tapes:

1. No heat is necessary.
2. Clean pipe first with a wire brush and wipe it dry.
3. If pipe is greasy, clean with solvent and wipe off.
4. On painted pipe, clean off loose paint, blisters and dirt. If paint is sticking to pipe, it is not necessary to remove the paint before applying the tape.
5. In wrapping pipe, overlap the tape one-half width so that when finished, there will be a double coat of tape.
6. In going through tight places with a wrapped section, apply additional coat for mechanical protection.
7. Where tape is used for coating on the service in the wall, wrap the pipe in the basement and ease the wrapped portion into place through the wall. Where pipe cannot be inserted from the basement, back the service into the basement enough to wrap the section that will be in the wall, and then ease it into place.
8. Air blisters in tape should be punctured; put patch over the puncture.
9. Wrapping is protection for the pipe. If it is damaged when put into place, that protection is nullified.

Summary

While these polyvinyl chloride tapes are suitable for all general pipe covering applications, they are particularly suitable for such applications as welded joints on mill-wrapped pipe, fittings, and short runs. They are also especially adaptable for inaccessible locations such as river crossings, under railroad tracks, through swampy areas, and through 'hot spot' runs where spot wrapping is required. Use of this material eliminates the transportation difficulties involved in bringing in over-the-ditch wrapping equipment.

The attempt of the authors has been to demonstrate that polyvinyl chloride tape most nearly approaches the ideal material for pipe protection as outlined previously. And it is a package material that can be used in the field immediately from the shelf.

Domestic Heating and Fuel Economy*

By MORRIS W. TRAVERS, D.Sc., F.R.S., Hon.M.Inst.F.

THIS note relates only to appliances burning what is officially known as 'boiler fuel.' When the shortage of fuel became acute, the author thought that it would be worth while making some attempt to increase the efficiency of his own house-heating appliances. Never having touched this branch of fuel technology before, he took the obvious line of trying to find out what had been done in the way of analysing the operation of such appliances.

The only work on the subject which he knew of consisted of experiments in which fuel had been fed to different types of appliances, generally designed by the investigator, and measurements had been made of the heat content of the fuel and also of the quantity and distribution of the heat available for house heating. No analysis could be found of any appliance regarded as a solid-fuel-burning machine. Inquiries of the six official and semi-official organisations concerned with fuel research proved fruitless; all that the author received in response were several pamphlets describing experiments of the kind already mentioned, and some interesting diagrams with arrows showing how air was supposed to enter the appliances, waste gas to leave them, and heat to distribute itself.

There seemed to be so little appreciation of what was being asked for that the author decided to put together the following memorandum.

At fuel economy meetings, which have been distinctly less frequent since the fuel crisis abated, the speaker generally tells his audience that 80% of the heat in the fuel burnt in domestic appliances goes up the chimneys. Yet none of our many fuel research organisations seem to have taken what should obviously have been the first step to find out why this is, and what is the cure for it—namely, to make full thermal and chemical examinations of the appliances actually in common use. Undoubtedly some makers of plant have done this for themselves. It is equally obvious that many have not. However, be that as it may, the suggested enquiry should be carried out in the public interest, and by publicly supported organisations. There is no subject in which the *public as a whole* is more deeply concerned.

Digressing for a moment from the main subject of this note, it may be pointed out that there are many points of detail of design of domestic appliances improvement in which would simplify the handling of them by the ordinary individual. But the ordinary individual of tomorrow will, it is to be hoped, know a great deal more about fuel and fuel-burning appliances than does the ordinary individual of today. We should anticipate this, and should make every effort to avoid faulty mechanical design. It should be possible accurately to set, and reset, any control, such as an air inlet, or damper. If an air inlet is situated in a feed or cleaning door, it should be arranged so that the slide or other control does not shift every time the door is opened or closed, and so that bits of ash and grit do not interfere with the setting. A clover-leaf arrangement is an ornamental addition to the appliance; but the possible accuracy of setting it is inversely proportional to the number of leaves, and the shape of the leaves makes exact setting impossible. Adjustment of a flap, or the front of an ash-pan, as an air inlet, cannot be exact. The only really satisfactory arrangement is a narrow slide, with a

* From the *Journal of the Institute of Fuel*, September, 1953.

scale at the side, and a set-screw to fix it after adjustment. The draught damper should also be capable of accurate adjustment. Ill-fitting doors are a source of inefficiency. For example, the author estimates that the leakage around the cleaning door of one of his appliances is equivalent to 0.5 sq. in. of air opening. This means that one cannot reduce the rate of combustion at night to the economic minimum by closing the door and the air inlet.

Details of the Heating Appliances

In the author's house there are two types of heating appliance, scale vertical sections of which are shown in Figs. 1 and 2. Fig. 1 represents a water-heating appliance, from which water circulates through radiators; it is

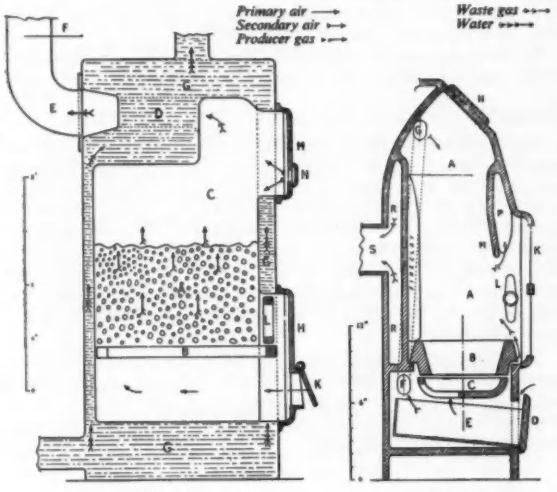


Fig. 1.

Fig. 2.

lagged and cased. Fig. 2 is a similar section of a stove for heating a single room directly. The fuel burnt in the former is No. 3 coke, or anthracite up to the size called 'french nuts.' In the latter No. 3 coke and stove nuts are burnt.

The Water Heater

The water heater is a stove of the 'gas-producer type.' When in operation the depth of fuel should be, according to the maker's instructions, such as to give 8 in. to 9 in. depth of glowing fuel; and as, under these conditions, the depth of glowing fuel over the opening of the cleaning door L is 4 in. to 5 in., one can assume that the fuel in the firebed is gasified rather than burnt. The appliance has three controls beside a check-draught—namely an air inlet K, in the cleaning door; another air inlet N, in the firing door; and a 'smoke-hood' damper. The air inlet K is a flap, hinged at the top, opened by a set-screw at the bottom, but it is without means of indicating how far it is open. N is a butterfly damper, but according to instructions it should be opened only when burning anthracite and similar fuels, and otherwise kept closed.

If cold secondary air is admitted from an air inlet in position N, little, if any, combustion will take place in the space above the fuel bed, and none in the fire tubes D. When using anthracite, the opening of N merely reduces the risk of explosion in the space into which the chimney commonly enters, by diluting the rich gas arising from the fuel immediately after firing. The damper consists of flaps at the outlet end of the fire tubes operated by a lever at the side of the appliance, by which the damper can be fully opened or fully closed, but which leaves intermediate positions indeterminate. The author prefers to operate with a slide damper, F, in the stack. This brings the check-draught (which is an adjustable cover to one of the dust pockets) on the wrong side of the damper, but this cannot be helped.

An investigation into the efficiency of the combustion process in this appliance, and the efficiency of heat transfer to the water, would be instructive. The heat given out to the room in which the apparatus is installed is small, but not negligible. The suggested investigation would raise the questions: (1) Is it possible to effect the efficient combustion of the fuel in the apparatus as it stands? (2) Could the efficiency of combustion be increased, (a) by any arrangement for heating the secondary air, or introducing it otherwise than as indicated; (b) by avoiding dilution by adding air to the gas stream; (c) by installing a combustion arch; or (d) by any other means? These questions can only be answered by research in which the combustion and heat-exchange processes are followed by the use of full chemical and thermal balance-sheets.

The Heating Stove

Turning now to the appliance shown in Fig. 2, this is apparently much more complicated but, in practice, is simpler to operate than the water heater just described. The former has three controls—the primary and secondary air and the damper—but in the heating stove there is only one, the common air supply. (After installing his stove the author was obliged to make a hole in the steel sheet closing the fireplace in which the appliance was installed, with a slide to act as a check-draught; but once this had been set, it was not touched again.)

The appliance is charged through H. The fuel fills the space A A, resting on the grate B C, of which the lower component C can be shaken for the removal of ash. The front is closed by a mica-panelled door, the fuel being kept from contact with it by the curtain M and the rocking grid L. The sides and back of the combustion space are lined with refractory, with a cast-iron backing between which and the casing of the apparatus is a flue space, entered by ports P, on either side of the front opening, and in front of the curtain M. The flue at the back is shown in section as R R. It leads into the chimney through S.

Air is admitted by tilting the front D of the ashpan E, by an arrangement which allows of not too regular adjustment of the admission of air to the space below the grate. From here the air divides into three streams: (i) entering the openings in C, passing into the bottom of the fuel bed, and gasifying the fuel; (ii) passing between B and the casing, and into the space between the front of the fire, and the door K; (iii) entering the lower end F of a tube which is formed in the back wall of the casing of the appliance, and passing out at G into the top of the space A A.

It would be interesting to know what happens to air streams (ii) and (iii) and what is the composition of the waste gas stream which passes outward under the curtain M through the ports P P entering the flues at the sides of the installation, which continue as R R, leading to the chimney S.

A study of the physical and chemical changes taking place in this apparatus would be of the greatest interest and importance. It might not be too easy, and would require high experimental skill to carry it out, but that should be a recommendation rather than a hindrance. How do the three air streams operate to secure the efficient combustion of the fuel?

The study of the appliance as a heating unit would be a simple matter. The heat radiated from the glowing fuel through the mica front of the appliance gives pleasure to the user. But in recognising its efficiency as a fuel burning machine one must take into account the fact that the waste gases are used to heat a very large area of the surface of the appliance before leaving it at S, and this heat is used in heating the room in which it is installed instead of 'going up the chimney.'

This note has dealt only with the two appliances which the author has to use. There are many other types to which the fuel research institutions might direct their attention. It is desired in conclusion to lay emphasis on the importance of making the investigations complete, with the compilation of full thermal and chemical balance-sheets.

ENSURING ADEQUATE PRESSURES

PRESIDENTIAL ADDRESS TO THE SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT)

by A. WALKER,

Assoc.M.Inst.Gas E., Distribution Engineer, Alloa-Stirling Sub-Group, Scottish Gas Board.

OUR Association will celebrate its Jubilee in 1954. I hope that this year will see the Association increase in strength and purpose.

Under the new Education Scheme it might appear to the junior Junior that the road to success is longer and rougher than ever before, and the reward no greater. Success, however, will only come to those who are prepared to work for it and through their studies qualify for suitable recognition. And when one looks at the matter broadly the Junior of today is offered more opportunities for learning and obtaining practical experience than ever before.

For long, distribution of gas has been a secondary consideration, with the result that distribution technical staff have been severely handicapped. Concentration has been on manufacture. While production capacity has increased in proportion to demand, distribution systems which previously served their purpose well enough have in many instances become incapable of meeting the extra loads. Only in recent years, with the continual rise in outputs and the consequent increased demands on the district mains, has attention been focused on the need for reorganisation of distribution systems.

Most distribution systems today are the result of a gradual growth over many years. Whether or not their layout follows the best practice, we must accept them as we find them and direct our efforts to their improvement and the carrying out of the first principle of gas distribution—*viz.*, to ensure that a sufficient supply for all requirements is always available to the consumer.

Classification of Distribution Systems

Distribution systems can be classified broadly and under three headings.

(a) *Low Pressure System.*—This is the simplest form of gas distribution, the pressure in the district mains being derived from the holder pressure, controlled as required by the station governor. The trunk mains radiate from the holder station, generally along the main thoroughfares and the intervening areas are supplied through a network of branch mains of smaller diameter.

(b) *Feeder Mains System.*—Where extensive development has taken place on the perimeter of an area of supply, the low-pressure system is invariably inadequate to meet such a situation since the mains have been progressively reduced in size from the distributing centre. Any extension at this point is at the expense of further reducing the pressure available to the existing consumers in that district. The high costs involved and the difficulty in finding space for a suitable size low-pressure pipe have accelerated the trend towards the laying of smaller diameter pipes operating at higher pressures and reinforcing the low-pressure system through district governors at suitable strategic points.

(c) *High Pressure System.*—This system is more suited to rural areas where greater distances are involved. The high pressure main may operate at pressures from 10 to 50 lb. per sq. in., individual consumers and small communities en route taking their supply directly from the main. The effectiveness of high-pressure supply turns upon the fact that, for the delivery of a given quantity of gas, the pressure required varies in direct proportion to the length of the pipe.

Steel *versus* Cast Iron

Much discussion has taken place about the relative advantages and disadvantages of steel pipes compared with cast iron for gas distribution. The main advantages in the use of steel mains lie in their strength, lightness, pipe length, and ability to be adapted to suit the track. On the other hand a serious disadvantage is their vulnerability to corrosion and erosion. While corrosion can be offset by a protective wrapping, it is essential that the wrapping be intact along the full length of the main; otherwise rapid deterioration is liable to occur. Where for some reason the soil round the main has been disturbed, care must be taken to ensure that the wrapping has not been damaged, and re-wrapping must be carried out when necessary. On examination of a steel pipe in use for 26 years I found that, whereas some parts were as good as new, other portions in a more corrosive sub-soil were deeply pitted and in some cases perforated.

With the advent of the spun iron pipe and its ability to withstand most pressures in use on distribution systems today, steel mains have to a certain extent fallen into disfavour. The resistance of spun pipe to corrosion is much higher compared with that of a steel pipe, while the use of flexible joints and greater pipe lengths compared with cast iron pipe are other points in its favour.

The Problems of Mainlaying

Mainlaying is an important task. It is a common misconception that little skill is required in this type of work. The greater use of mechanical joints, admittedly assisting considerably in the speed of mainlaying, has added weight to this point of view. Mains well and truly laid are an asset to any gas undertaking. Bad mainlaying can be a never-ending source of trouble and expense. In small undertakings the staff is not always available for the close supervision which the work demands, and a certain responsibility tends to fall on the man on the spot. It is essential that he should be properly trained in this type of work. It takes a few years to train a good main and service layer, and the best recruiting source is generally among the ranks of the unskilled labour who have been engaged for some time on this work. Due to the more attractive wage conditions in other industries, however, it is becoming increasingly more difficult to keep for any length of time the type of man suitable for the work. This has resulted in a tendency to employ gasfitters; and this is a negative approach to the problem, apart from being an uneconomic one.

To provide an adequate supply of gas to every consumer would be a simple problem if the demand were constant. From examination of the hour-by-hour output of any undertaking, however, it will be seen that, at a given period, generally between 12 noon and 1 p.m., the demand is greater than at any other period in the 24 hours. The actual period varies among different undertakings depending on their load characteristics. The average hourly rate of demand when expressed as a percentage of this maximum hourly rate of demand is known as the 'distribution load factor.' This figure is, in effect, a measure of the work being done by the mains.

Two problems which demand the attention of most distribution staffs today are:—

(a) Maintaining the district pressure at periods of peak demand.

(b) Meeting the demands of new housing development.

The two situations are closely related, the second becoming more than ever today predominant.

The simplest method to offset the pressure drop at the period of peak demand is to increase the pressure at the works by loading the station governor in accordance with

a predetermined timetable. This can be done manually or by some form of automatic loading device. This method is effective where the trunk mains are of adequate size, but I have found that the extra pressure put on at the works has often been barely discernible at the extremity of a district, being dissipated throughout the system before it reaches the point where it is most needed. Where the compensating pressure is high, consumers' meters in close proximity to the work have to withstand the full effect of the increase. A maximum pressure of 8 in. at a meter inlet should never be exceeded, but I am aware of meters operating under district pressures higher than this with no apparent ill effect.

Self-Loading Governors

An interesting feature of the new plant recently installed at the Wishaw holder station is the control of district pressure by two 24-in. self-loading Donkin governors. This type of governor is designed to modify the holder pressure to an outlet pressure ranging from 3½ in. W.G. to 9 in. W.G. A venturi is fitted in the outlet of the main governor which in turn actuates the main governor through a patent inspirator. As the demand on the district increases, the pressure in the throat of the venturi decreases relative to the governor outlet pressure. This increase in differential pressure, by means of the auxiliary system already mentioned, causes the main governor valve to open, thereby increasing the outlet pressure to meet the extra demand.

A solution to the two problems of district pressures and the demands of new development lies in the choice of one or more of the following: —

(*a*) Laying additional low pressure mains from the works, or carrying out extensions from a suitable source of supply.

(*b*) Laying new medium or high pressure mains from the source of supply to supplement the existing system through district governors.

(*c*) Adapting an existing low pressure trunk main for medium pressure.

(*d*) Erecting a holder station in the district.

The laying of new low pressure trunk mains has to be analysed carefully in view of their high capital cost compared with the smaller pipes required for medium or high pressure operation. In the latter method, however, there is the cost of provision and maintenance of the necessary pressure-raising equipment, governors, etc.

Adapting an existing main for medium pressure is an effective and quick method of increasing the supply with the minimum of expenditure. The use of this method, however, depends on the availability of a suitable main and the ease with which it can be divorced from the existing low pressure system. In addition, care must be taken to ensure that its condition will allow for the higher pressure involved. The merit of the fourth alternative is best understood when considered in relation to the difficulty experienced by our electrical competitors at periods of peak demand.

An intelligent estimate of further development, both domestic and industrial, is necessary, and much information can be obtained through close liaison with town and country planning authorities. Recently the development plan for the County of Clackmannan was published. This, I understand, is the first plan of its kind to be completed in Scotland, and it contains a wealth of information relative to development in the next 20 years. With information of this nature to hand, a more reliable forecast of probable future demands is possible. Forecasting always involves an element of risk, but in view of the ever-increasing costs of mainlaying, an optimistic outlook on future demands is an essential. Only by this approach can we avoid additional expenditure in the years to come, such as is being thrust on many undertakings today through a lack of foresight in the past.

Development at Motherwell and Wishaw

An example of the growth of a distribution system in a medium sized undertaking to meet present-day demands can be illustrated by reference to development in Motherwell and Wishaw. The area was originally supplied by two manufacturing stations, one at Motherwell and the other at Wishaw, four miles away. After the amalgamation of the two Burghs in 1920, steps were taken to concentrate manufacture at Motherwell, and in 1926 the Wishaw plant was closed down, the supply to that district being maintained by an 8-in. high pressure main feeding into the two existing holders. The smaller of the two holders had latterly to be put out of commission, leaving a holder capacity of 330,000 cu.ft. available.

The area is supplied entirely by a low pressure mains system, though facilities are available for reinforcing the supply through a governor in the Muirhouse area from the high pressure supply to Wishaw. While the system had been adequate to meet normal demands up to the immediate post-war period, the rapid expansion of the building programme and additional industrial and commercial loads threatened a general deterioration in the conditions throughout the district. The supply position was further aggravated by the condition of the remaining Wishaw holder. Settlement of the foundations due to mineral workings had occurred and the structure which had previously been repaired was in a severe state of strain and no other repairs or adjustments were considered feasible. In addition, since vesting date the possibility had arisen of the closure of the small works at Newmains, formerly owned by the Coltness Iron Co., and consideration given to the eventual supply of its consumers from the Wishaw area.

After taking into account the various factors involved, and since no great distances had to be contended with, it was decided that the best solution lay in extending the low pressure trunk mains system where necessary, replacing the holder at Wishaw, and laying a new trunk main from the holder to ensure an adequate supply in the Newmains direction.

A three-lift spirally guided holder of 1 mill. cu.ft. capacity was erected on a new site in the Wishaw area. This is ideally situated in the lowest part of the town 1,200 yards from the original holder site. Since it is on the route of the existing high pressure main, no difficulty arose from the point of view of its supply. The holder was put into operation in November, 1951, enabling the old holder station to be shut down. An Evershed height recorder is incorporated on the holder and connected by means of two G.P.O. lines to the compressor house at Motherwell, where a visual indicator incorporating a high and low level alarm is fitted. Since there is no permanent attendant at the holder station, this system is effective for the remote control of the holder through variation of the compressors.

From the holder, three 18-in. mains feed into the low pressure system. One of these was laid into the centre of Wishaw from where 1,800 yards of 14-in. and 2,200 yards of 12-in. pipe continue the supply as far as Newmains. At present 650 consumers in this latter district are supplied through this main. Only five connections have been made from this pipe into the low pressure system in order to facilitate its future use as a medium pressure feeder main if necessary. Provision has also been made on this main for future extension to the Coltness area.

A second of these 18-in. pipes links up with the 12-in. trunk main between Motherwell and Wishaw and extends through the Wishawhill housing site for later connection to a future arterial main.

A Speedy Development Phase

The greatest development has taken place in the North Motherwell area where the existing mains proved quite inadequate. A survey of pressures revealed the fact that at periods of peak demand the pressure in this area dropped to 15/tenths W.G. when the outlet of the station governor was registering 55/tenths W.G. The supply to the area was through a 12-in. main, decreased to 6-in. and eventually to two 3-in. pipes. Another 6-in. pipe entered the area from the Bellshill Road. A sufficient supply was available at the existing terminal of the 12-in. pipe and plans were made for the laying of the additional 2,300 yards necessary to extend it into the centre of the area. Half of this project is already completed.

In the Bellshill Road/Forgewood area there was the problem of a new industrial load of 30,000 cu.ft. per hour

(*Concluded on p. 52*)

COST CONSCIOUSNESS

PRESIDENTIAL ADDRESS TO THE EASTERN JUNIOR GAS ASSOCIATION BY

F. J. DENNY

M.Inst.Gas E., Works Manager, Ipswich District, Eastern Gas Board.

THE only way in which our industry can prosper is by supplying its consumers with gas and coke at the lowest possible price; and the only way in which this can be achieved is that everyone employed in the industry should know the cost of all the materials and labour, together with overhead charges, which constitute the price at which the final products are delivered.

The saying that 'Profits are made in the retort house' is still as true as ever. The outcome is the responsibility of the man in charge of the retort house whether those profits are large, small, or negative. The main consideration is whether the results are the best that can be obtained, not only technically in therms of gas per ton and hundredweights of coke per ton for sale, but also in terms of the net cost in pence per therm of gas *ex* retort house.

It must be remembered also that while profits can be, and usually are, made in the retort house, they can be drastically reduced or even lost in other parts of the works or in the distribution system. Each step of every process must be carefully watched to ensure that the economic as well as the technical results are the best possible.

Cost Interest

Every technician on the works should be interested in the cost of gas into holder, and he should be given access to this figure, and be enabled to compare it with those from other works. He should also know the costs in pence per therm of each section of each process, for both process and maintenance costs. By a careful study of these figures in conjunction with the technical results he will be able to see whether or not his costs compare favourably with those of other undertakings, and take any necessary steps to see why his costs should not be at least as low as, if not lower than, the others.

In a similar way the technician on the distribution side should be concerned with the cost in pence per therm from the holder to the consumer's meter, and he should be able, by comparison with other undertakings, to see that the consumer is getting the best service from his department at the lowest cost.

My stress on economic efficiency does not mean that technical efficiency is unimportant. Technical efficiency must be improved; but a careful watch must be kept to see that the improvement is not obtained at a cost above that which the results justify. Otherwise economic efficency will be lowered. As an example, we can consider the question of advocating the supply of a better coal at a higher price, on the grounds that higher technical efficiency will be obtained—perhaps a therm or two per ton extra or a little more coke for sale. If the extra cost of the coal is more than the additional revenue obtained from the increased yield, then the higher technical efficiency is of no use.

The consumer is not interested in our technical results. The housewife does not care how many therms we make from a ton of coal. What she is interested in is how much it costs to cook a dinner and so on. The gas industry cannot control the price of coal. What it can do is to see that the products from the coal reach the consumer at a price which will encourage the fuller use of these products.

Much has been said recently about the quality of coke, more especially in regard to the excessive amounts of 'bats,' or shale, which, as being incombustible, are heavy and cause trouble by blocking the grates of coke-burning appliances. At times this shale is of the 'flying' kind, and as such can be dangerous.

It has been suggested that coke might be cleaned at the gasworks, and the shale removed in the process, but this would be costly. The capital expenditure on the necessary plant would be prohibitive. It is impossible to visualise such a coke-cleaning process without a considerable rise in the sale price of coke. A far more satisfactory solution of the problem would be to clean the coal at the pit-head. Most pits have some form of cleaning plant already installed, and by closer attention to the operation of these cleaning plants better coal for carbonisation would be made available. It should not be too much to ask that we should be supplied with shale-free coal for the price we pay.

The report of the Gas Industry Productivity Team on their visit to America makes interesting reading, and has opened the eyes of many of us to the question of the possibilities of natural gas supplies. Our American confreres have certainly developed this source of supply into a vast concern, and it seems that carbonising plant, as distinct from coke ovens, is practically non-existent in America. To quote the Team's report, 'today virtually no retort installations are in operation.'

Propositions have been put forward for the provision of bulk supplies of coke oven gas over wide areas from pit-head plants; and should any quantity of natural gas be discovered in England it would seem that, over a period of years, we might well form a gas supply system in some degree comparable with that now in operation in America.

The distribution side of the industry would have new problems in long-distance transmission. A study of the methods adopted in the States is timely. Transmission difficulties would not be insurmountable in this country for a natural gas supply, a coke oven gas supply from pit-head or steel works, or for a grid system of supply from the larger and more economical stations.

Fuel Policy

The gas industry seems committed to the policy of being a two-fuel industry. Providing coal supplies remain sufficient for the production of enough coal gas to meet the demands for town gas, coke should be available in sufficient quantity to meet the demands for solid fuel, if the production of water gas is adequately controlled.

In regard to the policy of advocating gas for space heating and water heating, we come again to the question of flueless appliances and organic sulphur compounds in the gas. By law we must remove the last trace of sulphuretted hydrogen from our gas. But there is no legislation to restrict the amount of sulphur going into the distribution mains in the form of organic sulphur compounds—which yield exactly the same products of combustion as does sulphuretted hydrogen. The presence of these organic sulphur compounds, with their attendant nuisance in the products of combustion, has already lost us much trade in the space heating field, trade which will be hard to recover.

Butane-air gas contains no sulphur compounds, and in the towns where this gas is now being distributed there is a tendency to an increase in the sale of flueless gas appliances. Would it not be better to spend money on plant for the removal of the organic sulphur compounds

rather than spend it on advertising and sales campaigns to try to sell the gas containing them?

During the past year we have opened the ranks of membership of our Association to the technical representatives of the contractors to the industry. By doing this we have strengthened our Association to an immeasurable extent.

Friendly Contact with Contractors

The contractors are the people who design and manufacture our plant, and their technical representatives are the people who work out the theoretical principles on which the plants are designed, and who can explain the separate and conjoint functions of each part of the plant. The technicians of the industry are the people who are concerned with the day-to-day operation of the plant, and who, by experience, find out the operational snags which cannot always be foreseen in the designing stage.

By the intimate and friendly contact which is possible at the meetings of the Association, these two bodies of technicians can now get together. By listening to papers read at our meetings and joining in the ensuring discussions, and also by those friendly chats which always follow the meetings, nothing but good can result.

Most of the senior officials of the gas industry and the directors and managers of the contractors know each other well because of their contacts at Institution meetings. It is only right that the Junior members should have similar opportunities through the medium of the Junior Gas Associations.

Germanium

The recent discovery that the element germanium exists in, and can be economically extracted from, flue dust collected at certain points in the gasworks has added yet another by-product to the already long list of those of the gas industry; and the fact that germanium has an important use in the field of wireless transmission and reception has given importance and value to this by-product. It has, in fact, turned what was once a nuisance, and a source of expense to 'dump,' into a commodity worth £100 to £150 per ton; and it is noteworthy that flue dust with a content of as low as 0.1% germanium can be accepted, although the market value of this dust is only £10 a ton.

Clearly it will pay to exercise great care in the handling of this flue dust, especially that with the higher germanium content. It will take some time for the industry to get accustomed to the fact that here we have something valuable, and that each pound weight of dust spilled or thrown away can be equivalent to so many shillings wasted.

Methane Enrichment

THE catalytic synthesis of methane from the carbon monoxide and hydrogen contained in water gas and other industrial gases has long been known as a possible process for the enrichment of such gases to the calorific value of town gas. 'Catalytic Enrichment of Industrial Gases by the Synthesis of Methane,' H.M.S.O., price 2s. net (by post 2s. 1½d.), describes work carried out at the Fuel Research Station, Greenwich, with the object of developing a process suitable for large-scale operation. Such a process could be applied to water gas or producer gas made from coal or coke by existing processes. It could also form the final stage in the production of town gas by the complete gasification of low grade fuels.

The work was begun in 1939, with the co-operation of the gas industry, with the object of making gas from which liquid methane could be produced as a fuel for road transport. After the war emphasis was transferred to the possibilities of producing town gas from water gas without the use of imported oil. The report describes experiments with both laboratory-scale apparatus and small pilot plant.

The major problem was that of dissipating the heat of reaction, because excessive amounts of carbon are formed if the temperature of the nickel catalyst used is allowed to rise above 500°C. Two methods of solving this problem were investigated. In the first there were narrow beds of catalyst separated from one another by narrow compartments containing a liquid at a suitable temperature. The second method used a perforated sheet metal cylinder to contain the catalyst, the gas passing along the space between this cylinder and a surrounding cooled wall and having access to the catalyst only through the holes in the cylinder. In plant processing 200 cu.ft. of water gas per hour, both methods gave satisfactory results, the total yield of methane per pound of catalyst used being 2,000 to 3,000 lb. The second method is preferred for use in full-scale plant as the formation of carbon is almost completely eliminated.

Full-scale plant to process 20,000 cu.ft. of water gas per hour would use about 100 reactor tubes enclosed in a single cylindrical water jacket, perhaps 12 ft. high and about 2 ft. in diameter.

Although the experiments described have been carried out with gas at atmospheric pressure, it is believed that plant of similar type could be operated satisfactorily at higher pressures and that the formation of carbon could be controlled without difficulty.

ENSURING ADEQUATE PRESSURES (*Continued from p. 50*)

in addition to the load of extensive housing development. At present the industrial consumer is limited to night working, since a test on the mains in the area revealed a drop to 1 in. W.G. when the dual load was being taken. Delivery is now awaited of 800 yards 15-in. pipe and 1,400 yards of 12-in. pipe to enable a sufficient supply for both purposes to be available at the same time. Trunk mains of adequate size are now available in areas where further development is likely to take place and a satisfactory supply to all consumers is assured. Spun cast iron mains were used in every case with screwed gland, bolted gland, or Stanton-Wilson flexible joints.

Subsidiary Mains

In addition to the major projects, 7½ miles of subsidiary mains of 4-in. and 6-in. diameter have been laid throughout the various housing sites. These mains were laid in the footpaths 3 ft. in from the kerb in conformity with the local authority agreement for the positioning of gas, water, and electricity supplies. The work involved on all the projects was originally carried out by mainlaying squads of the undertaking, but as a result of the deterioration in the standard of unskilled labour available, a contractor has lately been employed.

The majority of the mainlaying was in a built-up area, but only on two occasions was some difficulty encountered in finding a route for the pipe at a reasonable depth. Each incident involved the crossing of a main road and necessitated a track 12 ft. deep in order to clear the congestion of pipes encountered in the pilot holes. A considerable amount of useful information in this respect was obtained through contact with the Burgh Surveyor's office, and water, electricity, and G.P.O. authorities.

Once put into operation, a system must be maintained in an efficient and reliable state by a good maintenance programme, otherwise it will eventually break down. The importance of such routine matters as emptying syphons, overhauling district governors, and such like tasks cannot be over-emphasised. In addition, a permanent record must be made of all mains and service work carried out. Our predecessors have often been condemned for the scant attention given to this matter in the past. Let us be sure that we in our turn will not stand convicted in the future.

THE United States Government has provided funds of over $1 mill. to enable 150 outstanding young scientists from Europe to study for up to two years in American research institutions. About 25 fellowships will be open for award to candidates from the United Kingdom, mostly between 26 and 32 years of age. Applications will be considered from candidates who propose to do research in the natural sciences and in the engineering, agricultural, and medical sciences, but not clinical medicine; they must possess a doctor's degree in science or have equivalent experience. Information is obtainable from the assistant secretary of the Royal Society at Burlington House, London, W.1.

Electricity, 1952-1953

THE British Electricity Authority has published its fifth report and statement of accounts. The document (H.M.S.O., 8s. 6d.) relates to the year ended March 31, 1953. At that date the number of consumers exceeded 13,884,000—nearly 4 mill. more than in 1939. Sales increased by 3.7% over the previous 12 months.

Sales of electricity exceeded 52,250 mill. units. This, as mentioned, was 3.7% more than in the previous year. Roughly half the sales are to industry, a third to domestic consumers, and an eighth to commercial consumers. Industrial consumption was 2.5% more than in the previous year, domestic 1.7% more, and commercial 11.8% more. Farm sales were up by 18.2% and public lighting by 9.0%.

The combined capital expenditure incurred by the Authority and the area boards during the year totalled £153.86 mill., of which £96.06 mill. related to the Authority and £57.80 mill. to the area boards. About 85% of the capital expenditure incurred by the Authority was on power station construction and extension.

TABLE I.—*Numbers of Electricity Consumers*

Types of Consumers	Numbers of Consumers at March 31, 1952	Numbers of Consumers at March 31, 1953	% Change during Year
Industrial	153,582	157,713	+2.7
Commercial	1,356,641	1,385,159	+2.1
Farm	123,732	134,429	+8.6
Domestic	11,811,505	12,203,284	+3.3
Traction	73	70	−4.1
Public lighting	4,123	4,105	−0.4
TOTALS	13,449,656	13,884,760	+3.2

TABLE II.—*Electricity Sold to Consumers*

Types of Consumers	Millions of Units			% Increase or Decrease of 1952-53 on—	
	1947-48	1951-52	1952-53	1947-48	1951-52
Industrial	17,573	25,242	25,879	+ 47.3	+ 2.5
Commercial	3,840	6,754	7,554	+ 96.7	+ 11.8
Farm	248	570	674	+171.8	+ 18.2
Domestic	12,305	15,984	16,260	+ 32.1	+ 1.7
Traction:					
Rail	767	914	933	+ 21.6	+ 2.1
Street	577	496	467	− 19.1	− 5.8
Public lighting	189	456	497	+163.0	+ 9.0
TOTALS	35,499	50,416	52,264	+ 47.2	+ 3.7

Rising Efficiency

The overall thermal efficiency of generation, states the report, continues to rise as more new high-efficiency plant is brought into operation, but much has also been achieved by careful attention to the condition of existing plant, improvements in the distribution of fuel, and the optimum loading of plant. The overall thermal efficiency of the Authority's steam power stations has risen steadily, from 20.87% in the pre-vesting year, 1947-48, to 22.04% in 1951-52 and 22.72% in 1952-53. Some 7¼ mill. tons of coal, it is reported, have been saved as the result of the improvements in the five years since vesting day.

The B.E.A. continued to be the largest individual purchasers of coal in Great Britain. In 1952-53 it consumed in its power stations 34.78 mill. tons of coal, and also 880,000 tons of coke and 60,000 tons of oil and other fuels. The total fuel consumption, 35.72 mill. tons, was 1.7% more than in 1951-52 and the corresponding increase in electricity generated was 4%, the difference between the two percentages reflecting the improvements in efficiency of generation.

The report explains at some length the experience of the Pimlico district heating scheme. In its latest form this provides for the supply of heat from the Battersea power station to a block of some 1,220 flats in Dolphin Square and to an ultimate total of 2,000 flats in the Pimlico, Cambridge Street, and Warwick Way housing estates of the Westminster City Council, the flats being situated on the opposite side of the Thames from the power station.

Steam from the main Battersea steam range at 600 lb. per sq. in. pressure is supplied to two 1,350 kW back-pressure generating sets, which exhaust to a heat exchanger at 17 lb. per sq. in. (absolute) and a temperature of 304°F. at full load. The circulating water from the district heating system, which returns at approximately 130°F., passes through the heat exchanger and is raised to approximately 200° before being pumped back through the heat transmission mains beneath the river. On the Pimlico side of the river the heat transmission mains are connected to a hot water storage vessel (an accumulator) and to the Pimlico pump house. From the pump house, heat distribution mains carry the hot water to serve the various blocks of flats with space heating and domestic hot water. The object of the hot water accumulator is to even out short-term changes in the heat demand, heat being stored or given up by the accumulator as the supply from the power station is greater or less than the demand.

The scheme was brought into initial operation early in 1951, but it was not until October of that year, when the Dolphin Square block was included, that a substantial number of flats were served. During the 12 months ended September, 1952, the number of flats connected increased from 1,457 to 1,798 and the total heat supplied by the power station represented approximately 630 therms per dwelling, of which nearly 8% was lost in distribution and transmission. Just over 1 mill. therms was sent out from the station and, states the report, the thermal efficiency, taking into account both the heat and the electricity produced, was 81.6%. These are partial and preliminary results. It is too early to form any firm judgment on the economic, financial, and technical merits of the scheme.

Consumers Connected

At March 31, 1953, the number of consumers connected to area board systems exceeded 13,884,000, being some 435,000, or 3.2%, more than a year before and an increase of approximately 2,170,000, or 19%, in the five years since vesting day. The year's increase compares with 426,000 new connections made in 1951-52.

Table I shows the numbers of consumers of the various main types. Consumers supplied under a combined domestic and commercial tariff have been allocated on an approximate basis suggested by the area boards concerned.

Table II shows the quantity of electricity sold to the various classes of consumers.

The foregoing pinpoints the major items in the report. We are very interested, however, in that section dealing with cooling water. Very large quantities of cooling water, it is stated, are required for the condensers of steam-driven turbines in power stations, and apart from inland rivers, the only effective sources are tidal estuaries and the sea. 'As there are weighty objections to placing the bulk of power stations round the sea coast, natural supplies of inland cooling water constitute a raw material second only in importance to coal in the operation of the power stations. The large amount of cooling water required at an inland station may be reduced by the use of cooling towers, which have necessarily to be provided in certain cases; but the towers are costly and their use reduces plant efficiency and therefore increases the consumption of coal. The recent coming into force of the Rivers (Prevention of Pollution) Act, 1951, and the corresponding Scottish Act, and a decision of the Courts relating to the River Derwent, may involve the Authority in substantial additional expenditure.'

Following Protests about the increased cost of gas and electricity for heating their ovens, members of the Bradford and District Association of the Baking Industry have decided that as their protracted negotiations with the respective boards had led to no satisfactory result they would follow up their decision to recommend members to convert their ovens to oil fuel heating by forming two separate sub-committees—one for those using gas and the other for those using electricity—to consider the position further, and, if desirable, to approach the oil companies for advice on oil fuel heating, and to report their findings to the association with a view to supporting its recommendation for a change-over to oil fuel.

A Difficult Year in the North West

THE North Western Gas Board experienced a difficult year in 1952/53, mainly because of the industrial recession, but also because of increased competition from alternative fuels, says the September issue of *Focus*, the Board's economic bulletin. Charts based mainly on already published weekly statistics compare the chief results during the year ended March 31 with past experience and with other Boards' results, but it is made clear that the comparisons noted for the 52-week period will not necessarily be in strict accord with those based on the annual figures which are due to be published shortly.

Gas sales in the North West at 339 mill. therms were 0.1% less than in the previous year. Analysis of sales in the 17 groups in the area shows sales decreases of up to 7% in the textile districts North and East of Manchester, while increases ranging up to 4% occurred in districts where engineering, chemicals, and other expanding industries are more strongly represented.

The main impact of reduced demand was felt in sales to domestic prepayment consumers, which showed a fall of 3.1% compared with 1951/52. Industrial sales were 4% down in the first half of the year, but recovered in later months so that the annual total was only 0.3% less than in 1951/52. Sales to commercial and other non-industrial premises increased by 10.5%.

Less Coke Sold

Coke sales at 1½ mill. tons were about 6½% less than in the previous year. Reduced industrial activity in the North West brought a fall of 9% in coke sold direct to industry, compared with a fall of only 3% in the gas industry as a whole.

The value of domestic appliances sold during the year at about £3,718,000 was some 10% less than in the previous year. This decline is mainly attributed to a reduction of 33⅓% in sales of appliances subject to purchase tax and hire purchase restrictions. Sales of cookers, which are exempt from both, increased by 0.7%.

It is pointed out that sales of gas, coke, and appliances in the second half of the year showed a marked improvement and that this has been maintained in subsequent months. *Focus* considers that excessive stocks of coke may well be reduced by higher sales of coke and of water gas made from coke, in the coming winter, while the recent removal of restrictions on the hire purchase of water heaters is an important step in the process of freeing the market for fuels and fuel appliances from regulations which inhibit competition and sales development.

A Recent Improvement

Figures of gas output and employment show an improvement in productivity during recent months. For the first four months of the current financial year (April-July, 1953) gas output at 105.5 mill. therms was 1.9% higher than in the corresponding period of 1952. Employees numbered 19,468, or 3.6% less than a year previously. Thus output per head showed an increase of 5.7%.

This represents a marked improvement compared with the year ended March 31, 1953, when output was affected by falling demand for gas during the period of industrial recession. During that year each employee of the Board produced 5.3% less than in the preceding 12-month period.

The rise in productivity during the current year coincided with a reduction in the number of employees. Total employees fell from 20,424 in November, 1952, to 19,173 in July, 1953. At the end of March, 1953, the number of employees was 0.3% less than 12 months previously and at the end of July it was 5.3% less than in July last year.

EMERGENCY SERVICE IN WEST LANCASHIRE

THE Chief Constable of Liverpool, Mr. C. C. Martin, C.B.E., officially released for duty on September 22 a new fleet of emergency repair vans controlled by two-way radio which the North Western Gas Board is bringing into service in the Western part of its territory.

The fleet consists in the first instance of four specially fitted vans each equipped with two-way radio-telephone. These vans are under continuous control from the headquarters of the Board's Liverpool Group at Radiant House, Bold Street. They will move immediately to any tasks detailed to them by radio-telephone, and will be independent of land-line communications. Thus they will form an important addition to Liverpool's Civil Defence safety measures as well as greatly speeding up the repair work for which they have been designed.

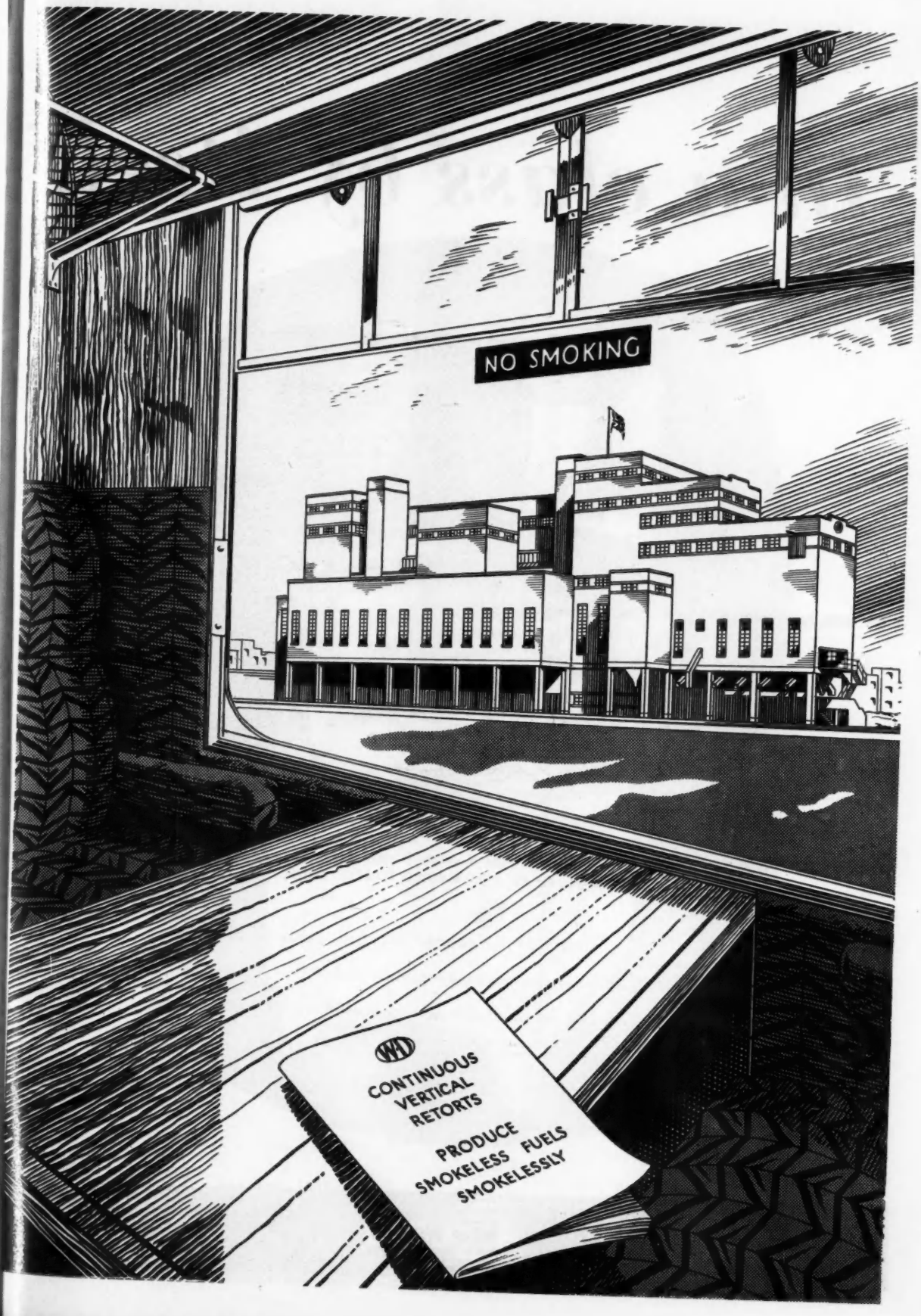
The Chief Constable of Liverpool, Mr. C. C. Martin, C.B.E., inaugurates the service in the Control Room at Duke Street, Liverpool. With Mr. Martin are (left to right) Mr. C. H. Leach, Liverpool Group General Manager; Miss Elizabeth Allan, the stage and television star; and Miss Frances Day, the actress.

The service has been on test for some weeks in ordinary working conditions and in addition to speeding up the work of repair the Board is satisfied that it will result in substantial economies.

Integration Around Cambridge

To meet increases in gas consumption at March and Wisbech and in view of the much greater demand in the near future at Wisbech due to the development of a new load in this district, proposals for a scheme of integration within the Cambridge Division of the Eastern Gas Board have recently been approved by the Board. This project will involve the laying of some 32 miles of steel gas mains connecting the existing gas undertakings at Peterborough, Whittlesey, March, Wisbech, and Chatteris. Suitable gas compressing plants will be installed at the Peterborough, March, and Wisbech works to enable the gas to be transmitted through integration of either the Peterborough or Wisbech extremities of the system. Development of the production plant is also planned at Wisbech to improve the gas-making capabilities of the works.

After implementation of the proposals the gas production plants at March and Wisbech will be operated at base load. In addition, the scheme will result in an improved supply of gas over the system as a whole. At the present time work is still in progress on the detailed planning of the scheme and it is anticipated that construction work will be commenced next spring and will continue for about nine months. It is expected that the integration system will be in operation before the winter peak loads of 1954 and 1955 have fully developed.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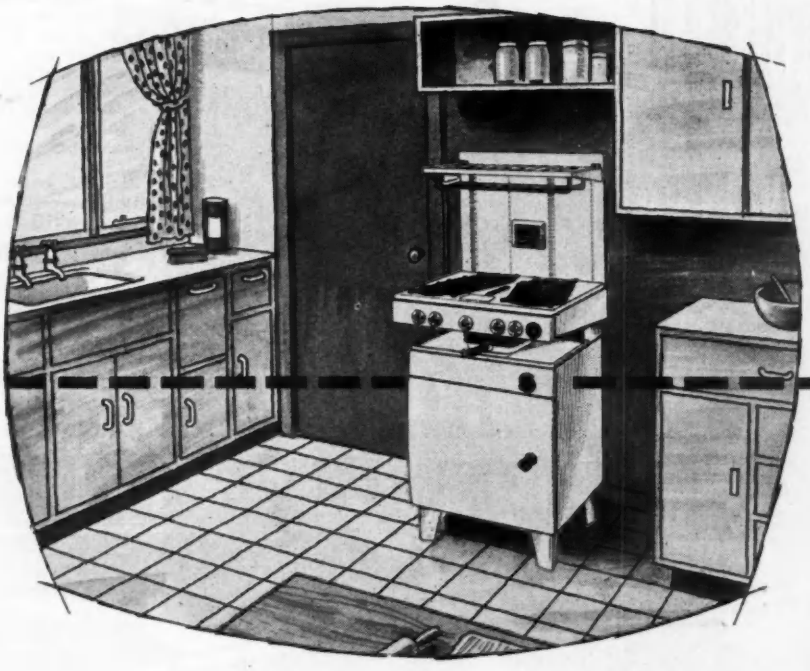

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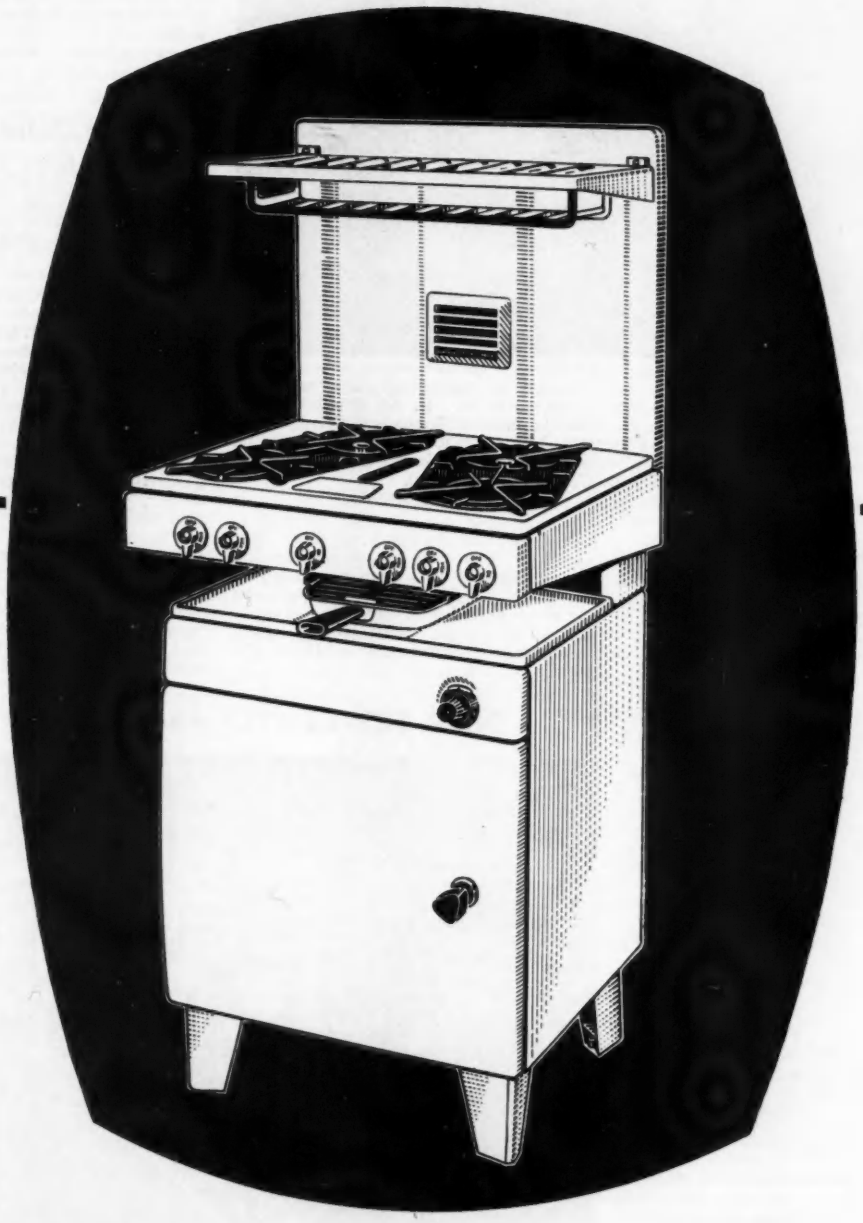

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BECKTON'S REBUILT HOLDER

MR. M. MILNE-WATSON, Chairman of the North Thames Gas Board, put into operation on September 25 one of the largest gasholders in the country at Beckton gasworks. This 8 mill. cu.ft. holder, bombed in 1941, has taken several years to rebuild and required 1,500 tons of steel. It is 247 ft. in diameter, rises to 176 ft., has a well 44 ft. deep, and required almost 1,500 tons of steel. The contractors were C. & W. Walker, Ltd.

Mr. Michael Milne-Watson turns the valve, helped by one of the valve men, Mr. Fred Redman. The group (left to right) comprises: Mr. F. M. Birks (Deputy Chairman, North Thames Gas), Mr. H. Bradley (Station Engineer), Dr. J. Burns (Chief Engineer), Mr. Brian Wood (Secretary), Mr. L. J. Clark (Beckton), Mr. J. Cross (Beckton), Mr. J. H. Walker (Beckton), Lord Verulam (Member of the Board) and Mr. W. R. C. Inkpen (Beckton).

Specialised Cookery

AMONG the many useful duties performed by members of the home service staff of the Cardiff undertaking of the Wales Gas Board is one which has recently been given a considerable amount of publicity in medical articles and earned for the local health authority the highest commendation. This is the weekly demonstration of suitable cookery which is given at the Diabetic Clinic to the many patients who are suffering from this particular disease.

The demonstrations receive wholehearted support and maximum co-operation from the medical and nursing staff, and recently the clinic was visited by senior officials of the Ministry of Health, and also by a party of colonial medical men visiting this country.

A special demonstration has been requested for an audience of doctors, nurses, and medical students who are interested in the treatment of this complaint. The normal audiences number 60 to 80 people. Photographs of the Cardiff home service advisers during recent demonstrations were shown to members of the British Medical Association during their conference at Cardiff.

The British Wood Preserving Association has arranged an extensive and varied lecture programme for the coming winter. Arrangements have been completed to date for 19 lectures, starting with a discourse by Mr. C. Sisley on 'Preservation' to the Sanitary Inspectors' Association at Salisbury last week, and ending with a lecture by Mr. E. H. B. Boulton on 'Timber Preservation' to the Building Societies Institute at Chatham on February 19.

Natural Gas in Italy.—Italian consumption of natural gas during the first six months of this year amounted to 36,000 mill. cu.ft., a 67% increase on the same period last year. The capacity of the Italian gas fields already under exploitation is estimated at about 423 mill. cu.ft. a day.

Yorkshire Jubilee

THE Yorkshire Junior Gas Association celebrates the 50th anniversary of its formation this year, and the occasion is to be marked by a Jubilee Week-End. On the evening of Friday, October 30, there is to be a dinner at the Hotel Metropole, Leeds, tickets for which are available at one guinea each from the Secretary.

On Saturday, October 31, by invitation of Mr. C. C. Wood, Sheffield and Rotherham Divisional Manager, East Midlands Gas Board, the members will pay an afternoon visit to the Carr House gasworks at Rotherham. The tour of the works will be followed by tea at the Assembly Rooms, Rotherham.

Junior Joint Council

THE British Junior Gas Associations Joint Council held its annual meeting on September 18 at the Royal York House Hotel, Bath. On the preceding Thursday evening, delegates were honoured by the presence of Mr. C. H. Chester, Chairman of the South Western Gas Board, at the dinner given by invitation of the South Western Gas Board. Mr. Chester was supported by Mr. J. Carr, Area General Manager of the South Western Gas Board. At the conclusion of this function, Mr. Chester addressed a few remarks to the assembled delegates.

Mr. O. Pincock, the President of the Western Junior Gas Association, who presided at the meeting of the Joint Council, voiced the thanks of the juniors to Mr. Chester and the South Western Gas Board.

The business meetings of the Joint Council, which commenced at 9.30 on Friday morning with a short meeting of the Executive Committee, followed by a full meeting of the Joint Council, proved in every way successful and demonstrated the solidarity of the juniors, each of the Junior Associations being represented.

NEW HONEYWELL-BROWN FACTORY

One hundred guests attended the official opening of the new Newholme factory of Honeywell-Brown, Ltd., on September 18. A single floor construction, with two-floor offices, the factory comprises stores, machine, press, drill, and metal working shops, tool room, finishing shops, sub-assembly, assembly, and calibration areas. The whole factory is equipped with very modern machinery and affords facilities to double the employment and to achieve more than double the present output. The photograph shows the calibration test and inspection department.

Financial Control in Large-Scale Undertakings

DR. J. M. S. RISK, Chief Accountant of the Southern Gas Board, read a paper on 'Financial Control in Large-Scale Undertakings' at the fourth residential summer school of the Institute of Cost and Works Accountants at Cambridge on September 22. Early in his paper Dr. Risk made the point that there are more similarities than differences in the many types of large-scale undertakings—private enterprise, nationalised industries, Government departments, local authorities, and public corporations, despite their varying forms of legal organisation.

A study of present day practice, he said, suggests that much could be done to improve techniques and that for many reasons budgetary control is the best accounting tool available.

Accountant as Pathfinder

It may be necessary and possible to correct the effects of past actions, but it is never possible to change them. Accounting statements should not merely induce action to correct irregular tendencies in the past but should in every way possible point the path to the future. Budgetary control is a boon in this connection, and there is little need to stress it or to emphasise its advantages. It is, however, the accountant's duty to extract from the accounts every indication of the future trend of affairs so that he may become a pathfinder for the business.

Financial accounts should tell what has happened but not endeavour to explain how or why, which is the task of the functional or objective form of accounts. The financial results will therefore be related to capital employed to determine the effectiveness with which resources have been used.

In a recent Acton Society Trust publication the employees in nationalised industries were stated to be just short of 2 mill., covering coal, electricity, gas, and transport. The administrative tasks imposed by the act of nationalisation were immense, and it may be difficult for those who have not experienced the ordeal to appreciate quickly the size of the problems involved. For example, before vesting date there were about 750 coal undertakings controlling a total of about 1,500 pits.

Budgetary Control

The structure of the coal industry may involve as many as six levels, these being: board level; division; area; sub-area; agent; colliery manager. While this is not so in all cases, there is clearly a problem of control which must have greatly exercised the minds of those responsible for the industry. It was of interest to learn some time ago that the system of budgetary control was being introduced into the coal industry.

Although the electricity and gas industries are not so large as the National Coal Board, they are still of substantial proportions, having between them over 300,000 workers, while transport has somewhat less than 1 mill. employees. In so far as these boards represent former companies operated by private enterprise, it does not seem that the form of economic control should be different from what it was or could have been, although there are new problems of co-ordination to be subdued.

On the other hand, any increase in monopolistic status or diminution of the need to make profits for survival necessitates the strengthening of those forms of control which view operations from the aspect of making the most effective use of economic resources. In brief, one may say that economic control is both possible and essential for all four nationalised industries.

At the end of his paper Dr. Risk put forward the following principal conclusions:

Control at top level must be in financial terms, not because of any special virtue in accountants or in money itself, but because money can convert so many things into a common measure.

There are certain differences to be found between small and large undertakings, as a result of which control becomes more difficult. The tendency for control to be through accounting statements becomes more marked, and because of the greater need for planning to co-ordinate many activities the value of budgetary control is even greater than in small undertakings

Control operates through people, so that the form of organisation is relevant to the form of control. If the organisation is diffuse and without clear lines of authority, then the control also becomes uncertain.

Devolution of Authority

In large undertakings budgetary control aids the successful devolution of authority and assists not only in translating medium- and long-term proposals into practical plans but also in checking performance against forecast. It has been suggested that planning necessitates the translation of facts (or estimates) into terms of money, whereas control, or, more correctly, the means of control, is obtained by turning money values into facts. A similar form of control should be in use in virtually all large-scale undertakings, irrespective of their legal constitution.

Economic control is facilitated where an organisation 'buys, makes, and sells,' but the principles of budgetary control can be applied to almost any activity.

Economic control necessitates the making of a plan and the identification of key factors to assist in guiding events towards the successful achievement of the plan.

Control is carried out by means of people; this is recognised by Lever Brothers and Unilever Ltd., through 'the selection and annual review of remuneration of top management.'

As control statements are expressed in terms of money at the higher levels, it is important that accounting statements should be prepared with precision. Careful definition of all matters usually included under the heading of uniform accounting is essential. There is room for great progress in this direction.

For control purposes, 'relevant' accounts should be prepared promptly at short intervals and be accurate, comparable, and consistent; they should be related to standards, be forward-looking, and be presented in such manner, to such persons, and at such time as will tend to induce action. It is probable that such accounts will be in budgetary control form.

Financial control should show overall results in relation to net assets employed and should not seek to show how these results have come about, this being the task of the functional (*i.e.*, objective) form of accounts.

The term 'financial accounts' as currently used is considered to have no logical foundation, and it is proposed that a set of accounts in subjective form should replace all forms of so-called 'financial accounts.' It is assumed that accounts in objective form would also be prepared.

With the new form of financial accounts there should be a review of financial results for five to ten years or longer, and also certain other types of information already mentioned.

Savings and improved productivity are not achieved merely by installing the mechanics of budgetary control; they come through intelligent application of the information presented. Moreover, results are achieved through the agency of human beings, and budgetary control is no substitute for good management.

Author's Many Interests

Dr. Risk is a Fellow of the Institute of Cost and Works Accountants and holds the degrees of PH.D. and B.COMM., Edinburgh University. He is a Scottish Chartered Accountant and an Associate of the Chartered Institute of Secretaries. He was a founder member of the British Institute of Management and is a member of a number of other management societies. Since 1949 he has been chief accountant of the Southern Gas Board, with headquarters in Southampton. In that area there are over 500,000 consumers spread over 570 sq. miles, and the revenue from gas and by-products is well in excess of £13 mill a year.

Before taking up his present appointment he was head of the Department of Industrial Administration, Royal Technical College, Glasgow, and also carried out consulting work. Prior to that he was on the staff of Personnel Administration, Ltd., industrial consultants. For several years he was Chief Accountant to the Middle East Board of the U.K. Commercial Corporation, a Treasury-owned war-time corporation, and during the war he served as an executive officer in Royal Ordnance Factories.

Dr. Risk is a member of the Institute of Cost and Works Accountants' Research and Technical Committee and Chairman of the Hampshire Sub-Branch of the Institute.

The Eastern Gas Board has approved plans to link up gas undertakings at Peterborough, Whittlesey, March, Wisbech, and Chatteris in order to improve the supply in the entire area. The scheme involves laying 32 miles of mains and it is expected that the new system will be in operation by the winter of 1954-55.

Clock Control of Gas Lamps.—Westminster City Council's works and traffic committee decided to accept a proposal by the North Thames Gas Board to install clock control of the street gas lamps in the city, and to purchase the controllers outright for £4,346, including installation costs. The Board agreed to reduce maintenance charges by £1,311 per annum.

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Clean design and vitreous enamelled surfaces throughout—exterior finished in cream • four dual-purpose hotplate burners—all can be used for fast-boiling or simmering • large griller with grill pan and crosswire grid • hotplate fittings can be easily removed for cleaning • hotplate-well free from projections and dirt traps • safety-type gas taps • double-shelf plate-rack • roomy oven giving high-quality cooking performance with minimum gas consumption and with easy-to-clean rounded corners • Mainstat oven heat control • flash tube lighting to oven burner • drop-type door allows maximum light to enter oven • used oven heat vented in front of backplate and warms plate-rack • storage space in plinth base • hotplate side extensions and gas lighter supplied if required.

The Century cooker combines efficient performance with ease of cleaning.

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London and Falkirk

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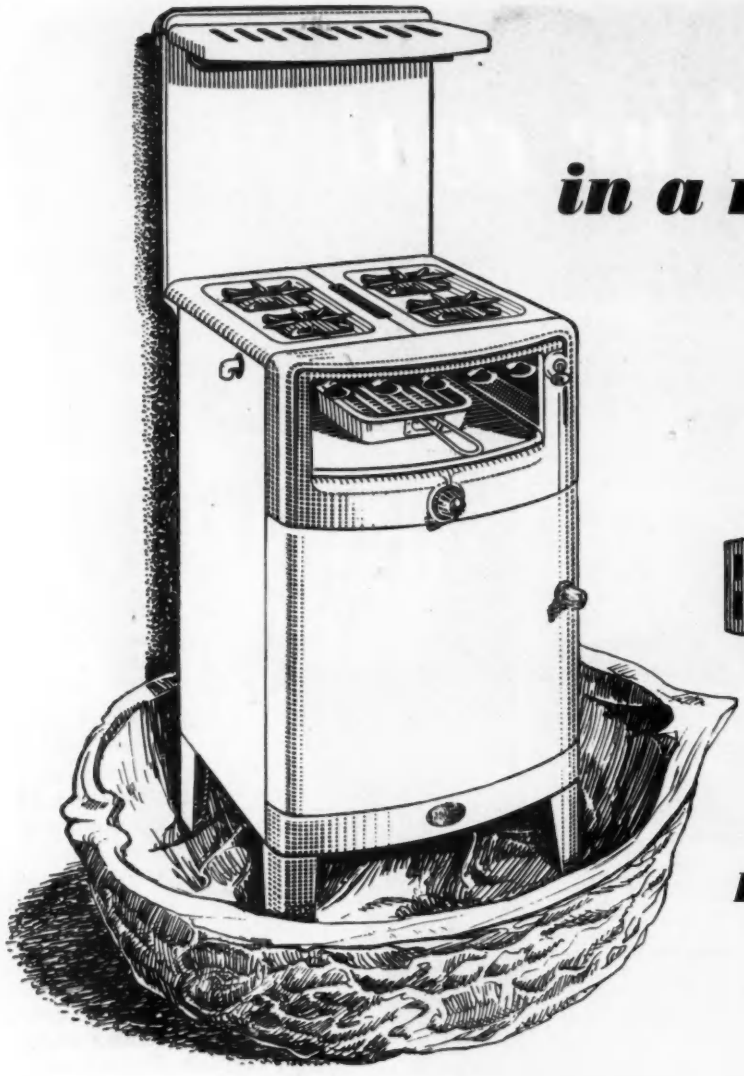

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Consultative Council and Fuel Policy

THE need for a national fuel policy was again stressed at a meeting of the Eastern Gas Consultative Council on September 21. So strongly was this felt that the Council resolved to approach the Minister of Fuel and Power on the matter and called for the support of the other gas consultative councils.

Lieut.-Col. R. I. Musson (Barnet), a nominee of the Urban District Councils Association, said a number of circumstances had recently combined to stress the importance of conserving the nation's coal resources by the adoption of a national fuel policy. The Ridley Report was still fresh in mind and now came the report of the Anglo-American Council on Productivity adding further weight to the growing demand from every section of informed opinion throughout the country for the establishment of a national fuel policy without further delay. The Press, both technical and national, was lending its support to the demand.

What was the Minister of Fuel and Power doing about it? So far as could be ascertained, no action had been taken by successive Ministers, whether Socialist or Conservative. The Eastern G.C.C. had always advocated a national fuel policy and at its last meeting passed a resolution calling on the Government to implement the Ridley Report. The Council, said Col. Musson, was charged with the duty of considering any matter affecting the supply of gas in the area. Surely it was equally the duty of the Minister to give ear to its recommendations and, if unable to adopt them, to extend at least the courtesy of giving the reasons.

He suggested that the chairmen of gas consultative councils should get together and agree on concerted action; let it be made clear to the Minister that members meant business and that the Minister must expect increasing pressure from the councils and from the powerful interests which the Council represented until something was done.

Glittering Extravagance

They were all agreed that the all-electric house was a piece of glittering extravagance which the nation could no longer afford. In the national interests, the most economical fuels for domestic use were: (1) Solid fuel—and wherever possible—smokeless fuel for continuous cooking—space heating and water heating; (2) Gas for intermittent cooking, space, and water heating; (3) Electricity for lighting and power. It was important that where available a gas supply should be laid on at the time of building. Under no circumstances must the capital cost of the installation be allowed to rule out gas.

Quarterly statements of tests made of the gas supplied by the Eastern Gas Board for the quarter ended June 30 were received. The Council approved a number of appointments to divisional committees.

Eastern Juniors Meet at Ipswich

THE Presidential Meeting of the Eastern Junior Gas Association took place on September 26 at Ipswich and about 140 members and their ladies were present.

At the general meeting Mr. J. Anderton (Group Distribution Superintendent, Great Yarmouth Group, Eastern Gas Board) handed over the chair and badge of office to Mr. F. J. Denny (Works Manager, Ipswich District), who then read his address, which is reported fully on p. 51 of this issue. Mr. R. A. Robinson (Watford) proposed a vote of thanks.

Lunch followed at the Great White Horse Hotel, at which Mr. J. H. Dyde (Deputy Chairman, Eastern Gas Board) proposed the toast of the Association.

Mr. Dyde said that he thought they must have taken his words about cost consciousness to heart, as figures showed an increase in the cost of gas (on the Board) as 0.55d. and in Ipswich of only .06d. The time had come when they must think, act, press forward, and promote the potentialities of gas as a modern fuel for heating purposes.

He concluded by wishing the new President a successful year of office and congratulating him and his staff on the calm and efficient way in which they handled what might have been a disastrous fire in the deep purifiers last year.

Mr. Denny responded by saying that they were glad to welcome the contracting side of the industry to their membership. He thanked the Secretary (Mr. R. W. Hilham, Colchester) for his continued good work and announced that next year they were to be hosts to the British Junior Gas Association Council.

Mr. H. R. Stanley (Cambridge) briefly proposed the toast of the Eastern Gas Board, to which Mr. W. J. Collins Garrard (General Manager, Ipswich Division) replied.

The company then went by launch on a cruise down the River Orwell, past the famous Butt and Oyster at Pin Mill to the Harwich Estuary and thence up the Stour to view the ships of the Reserve Fleet.

Fuel Convention

FUEL efficiency experts and representatives of coal interests in five European countries will be among the several hundred delegates attending the first post-war convention of the Coal Utilisation Council, to be held at Harrogate, on October 14 and 15.

The foreign delegates will include: M. Pierre De Smet, Member of the Belgian Senate; M. Jean Couture, Director-General of the Economic and Commercial Services of the French Coal Industry (Charbonnages de France); M. Robert Fossonier, president of the French Coal Importers' Syndicate; M. Jean Commelin, Director-General of the Central Office of Efficient Heating, Paris; Mr. K. G. Ljungdahl, of the Scandinavian Coal Importers' Federation, Stockholm; Mr. Niels Westergaard, director of the Danish Coal Company, Copenhagen; Mr. O. J. Jorgensen, of the Copenhagen Technological Institute; and Dr. Fritz Wiedemann, of the German Coal Industry, Essen.

The theme of the convention, which will be addressed by Sir Hubert Houldsworth, Chairman of the National Coal Board, and other speakers, will be 'The Use of Solid Fuel in the Home.'

Domestic Coal Consumers Council

THE Minister of Fuel and Power has reconstituted the Domestic Coal Consumers Council for its third term of office, ending in July, 1956. Alderman Mrs. F. H. Cantwell, J.P., who has been Chairman of the Council for three years, has been re-appointed to that office, and Mrs. R. Beale, O.B.E., who is a representative of Women's Institutes, has again been appointed Deputy Chairman.

Other members re-elected include Sir John Charrington (Vice-President of the British Coal Utilisation Research Association), Mr. J. O. Cooke (Manager, Coke Department, Gas Council), Mrs. M. Pleydell-Bouverie (Member of the South Eastern Gas Consultative Council), and Dr. D. T. A. Townend (Director-General of the British Coal Utilisation Research Association). A new member is Councillor A. W. Lowe (Member of the North Western Gas Consultative Council and Chairman of its Western Committee).

MANCHESTER GOLF

The Manchester and District Golf Circle held its autumn meeting at the Pleasington Golf Club, near Blackburn, recently, when members spent an enjoyable day on this picturesque Lancashire course. The silver cup was won by Mr. J. Search. Mr. E. Bacon was runner-up. Prizes were presented to the winners by Mr. J. H. Richmond, President of the Circle, who was re-elected President for the ensuing year. Our photograph shows Mr. Richmond (left) presenting the cup to Mr. Search.

The Address of the West Midlands Gas Board Coke Department and the District Coke Representative of the Ministry of Fuel and Power has been changed temporarily from King Edward House, New Street, to 6, Augustus Road, Edgbaston, Birmingham 15 (telephone EDGbaston 3616. The permanent address from November 9 will be 60, Hagley Road, Edgbaston, Birmingham 16 (telephone EDGbaston 3682/3/4).

Trade News

Compoflex Company

The Compoflex Company, Ltd., has published a comprehensive brochure on 'flexibles,' the first, we believe, of its kind. The title of this well-illustrated and admirably produced guide is 'Compoflex Flexible Tubing and Hoses.' There is an aim behind this brochure—and that is to provide industry with a practical service which is the result of years of experience. If there is a 'flexible' problem, enquirers are asked to call at 26, Grosvenor Gardens, S.W.1.

Foster Transformers, Ltd.

The call for increased production by all branches of industry is overloading available power supplies which results in voltage fluctuations of as much as plus 5% and minus 15%. Modern industrial processes requiring constant stable power supplies for continuous production or heat treatment are consequently experiencing more than usual difficulties. To cater for this demand Foster Transformers, Ltd., have developed a range of voltage regulating equipment to cover the needs of many processes. A list of applications for which it may be used is given in a new leaflet, copies of which —FM.14—may be obtained from *Foster Transformers, Ltd., South Wimbledon, S.W.19.*

George Cohen

Up to the outbreak of war, it was the custom of George Cohen Sons & Co., Ltd., to issue catalogues of their entire stocks of new and secondhand machinery and works equipment. Then came the Government Order to restrict the use of paper to more urgent things and the publication of these catalogues was perforce abandoned. The firm has now decided to send to its customers combined catalogues to which they can refer whenever they are in the market. Obviously stocks are continually changing and the firm therefore intends to issue further editions three or four times a year. The present comprehensive catalogue runs to 200 pages.

Flexible Hose Lines

Time wasted by having to scour the hose lines with detachable, reusable fittings represents a new departure in the field of flexible tubing. With the use of these fittings, stocks can be cut to a minimum. Hose lines can be hand-assembled on the spot, using bulk hose and the particular fittings needed. Aeroquip hose fitting consists of two basic parts: A socket and a nipple. A coarse left-hand thread provides a means for screwing the hose into the socket. A recess facilitates greatly the insertion of the nipple which is screwed into the socket by means of a fine thread, thus firmly gripping the hose. Once assembled, Aeroquip fittings need no adjustment or tightening. Flexible lines can thus be made up by maintenance personnel, with bulk hose fittings, in any size or length required, and the fittings may be saved and re-used many times.—*Super Oil Seals & Gaskets, Ltd.*

Full-Way Fittings

Time wasted by having to scour the inside of copper tubing fittings with steel wool to prepare them for soldering, is eliminated with the improved Ideal Full-Way fittings, the makers claim. These are tinned throughout, and therefore ready for immediate use. Besides the saving in labour, the incidence of imperfect joints is reduced, and there is less possibility of corrosion. An unrestricted flow is provided as the tube seats against the shoulder of the sockets in the fittings and the bore is therefore flush throughout. The joints are stronger than the tube itself, and are unaffected by hot water or by temperatures below freezing point. They are interchangeable and manufactured for use with light gauge copper tube to numbers BSS.659 and BSS.1386.—*Ideal Boilers and Radiators Ltd., Ideal Works, Hull.*

Company News

NEWTON CHAMBERS

On October 15 the directors of Newton Chambers and Co., Ltd., will pay an interim for 1953 of 10% on ordinary capital of £653,040 as increased this year by a 6¼% scrip issue. The interim for 1952 was 7½% and final 17½%, making 25% on smaller capital.

STURTEVANT ENGINEERING

The board of the Sturtevant Engineering Co., Ltd., has declared an interim dividend of 5½% free of tax, on account of the year ending December 31, 1953. With this declaration is the proposal to issue 197,256 new shares in the proportion of one for eight shares held, by capitalising £49,314 from general reserve. The new shares will not rank for the interim dividend. The intention is to issue the new shares by means of renounceable allotment letters on November 2 to shareholders registered October 23. An extra-ordinary meeting will be convened for November 2 to approve the necessary resolution.

SOUTH AUSTRALIAN GAS

The 92nd annual report of the directors of the South Australian Gas Company presented at the recent annual meeting showed a net profit for the year (after transferring £41,905 to the special purposes fund and providing £26,605 for deferred maintenance of meters) of £117,000, making available a total of £165,750. Dividend for the half-year ended December 31 at the rate of 5% and for the half-year ended June 30 at the rate of 6% absorbed £107,250, leaving a balance carried forward of £58,500. Interest and other charges amounting to £26,605 incurred in major plant extensions have been capitalised.

COLONIAL GAS ASSOCIATION

The directors of the Colonial Gas Association, in their 65th annual report, state that net profit, after providing £75,500 for taxation, is £119,161. Adding to this, £6,182 brought forward from the last accounts and deducting the interim dividends paid in April last and the final dividends recommended, leaves a balance at credit of the appropriation account of £9,849. The net profit is a return of 5.38% on the shareholders' funds. Dividends are recommended at the rate of 8% (Australian currency) on the preference shares (less interim dividend of 4% paid in April); and at the rate of 7% (Australian currency) on the ordinary shares (less interim dividend of 3½% paid in April). For the year, sales increased by 5.6% and the sales of subsidiary gas companies by 3.6%. The report says that quality and quantity of coal received continues to be very unsatisfactory. In addition, cost has further increased, necessitating an increase in the price of gas from July. The demand for extensions to reticulations throughout the States supplied continues, and further extensions of plant have become necessary. Last November, a prospectus was issued in Australia inviting applications for £A300,000 of a third series of debentures at £5 2s. 6d.%, maturing December, 1964. The issue was oversubscribed. A further prospectus has now been issued in Australia offering the balance of this series, namely, £A482,000 with interest at 5%, maturing November, 1961. As a first step in the reconstruction programme, Colonial Gas Holdings, Ltd., a company formed by the Association, was incorporated in Victoria in August.

CROSSLEY BROTHERS

The preliminary figures of Crossley Brothers, Ltd., show a decrease of £42,194 to £437,772 in the consolidated trading profit for the year ended April 30, 1953. Net trading profit, after taxation of £176,914, against £224,528, and other charges totalled £140,722, compared with £148,991 for the previous year. Only the accounts of the home subsidiary—Crossley Premier Engines—have been consolidated. The dividend on the deferred ordinary capital is maintained at 15%, less tax, with an unchanged final of 10%. The directors state that in view of exchange difficulties or the insignificant amounts involved, they are of the opinion that consolidation of the other subsidiaries would be of no real value to members of the company. The corresponding figures at April 30, 1952, have been adjusted to show a true comparison with the results for this year. Crossley-Premier Engines, controlled by Crossley Brothers, announce a net profit, after depreciation of £95,929 for the year ended April 30, 1953, against £123,315 for the previous year. The ordinary dividend is 15%, less tax, the same as for each of the three preceding years.

BENNIS COMBUSTION

The Board of Bennis Combustion, Ltd., has decided to raise the final dividend on the £112,500 ordinary from 5% to 7½%, making 12½% for the year to April 30, 1953. This compares with a total of 10% paid on capital as increased in October, 1951, by a 50% scrip issue. Group net profit is £34,084 higher at £63,920 after charging £31,000 more for tax at £53,650.

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DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

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FIBRE BRUSHES
RUBBER MOPS

"KAY-DEE" *

KETTLE DESCALER

For resale to the public, and in bulk for Works use.

BALE & CHURCH, LTD.

7, CROMPTON WAY, CRAWLEY, SUSSEX.

PUBLICATIONS

GAS ACCOUNT CALCULATORS

SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.

'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

PATENTS

KINGS PATENT AGENCY, LTD.

(Director, B. T. King, A.I.Mech.E., Patent Agent.) Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. 'Phone: City 6161.

MISCELLANEOUS

SMALL single truckloads and larger quantities of good ROUGH BREEZE from any gasworks, large or small, in the United Kingdom required by merchants paying own railway tolls. Cash price and particulars to No. 9378, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WATER-CONTENT TEST — 3 MINUTES — Already in use in the gas industry, "SPEEDY" MOISTURE TESTER gives accurate results with coal, coke and ash, and many chemicals. Needs no electricity; no skill. Portable. Write for illustrated brochure or order direct £24 10s. 0d. complete.—Thos. Ashworth & Co., Ltd., (Dept. G.J.), Basket Street, Burnley, Lancs.

APPOINTMENT

SOUTH AFRICAN LIGHTING ASSOCIATION LIMITED

APPOINTMENT OF ENGINEER & MANAGER

MR. K. F. KEEBLE, M.Inst.Gas E., A.M.I.Mech.E., A.M.Inst.Fuel of Aberdeen has been appointed Engineer and Manager of the Association's Gas Undertaking in Grahamstown, and will arrive in South Africa to take up the appointment at the end of this month.

C. B. G. TURNER,
Secretary.

October 2, 1953.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

SCOTTISH GAS BOARD

DUNDEE GROUP
DUNDEE UNDERTAKING
SENIOR TECHNICAL ASSISTANT

APPLICATIONS are invited from suitably qualified Engineers for the position of SENIOR TECHNICAL ASSISTANT.

Salary: Grade X (Provincial 'A') (£665-£765) of the National Salary Scales, with placing according to qualifications and experience.

Qualifications: Engineering Degree or Higher National Certificate of the Institutions of Gas, Civil and/or Mechanical Engineers or equivalent.

Duties: Construction, Reconstruction, Repair and Maintenance of Plant, Gas Works and District Holder and Governor Stations. Previous Gas Works experience although desirable is not essential.

A rented house will be available if required by the successful candidate.

Applications stating age, education, training, qualifications and experience and whether present post is superannuated, should reach the undersigned within fourteen days of the date of publication of this advertisement.

W. S. JOHNSTON,
Group Manager.

Gas Works,
50, East Dock Street,
Dundee.
October 2, 1953.

SCOTTISH GAS BOARD

DUNDEE GROUP
DUNDEE UNDERTAKING
ASSISTANT SUPERINTENDENT (MAINS)

APPLICATIONS are invited from suitably qualified Gas Engineers for the position of Assistant Superintendent (Mains).

Salary: Grade IX (Provincial 'A') (£615-£715) of the National Salary Scales with placing according to qualifications and experience.

Qualifications: Higher National Certificate of Institution of Gas Engineers in Gas Supply or equivalent.

Duties: Design of Distribution Development Schemes with Linkage between Undertakings—Superintendence of Main and Service Laying—Maintenance of Mains and Services.

A rented house will be available if required by the successful candidate.

Applications stating age, education, training, qualifications and experience and whether present post is superannuated, should reach the undersigned within fourteen days of the date of publication of this advertisement.

W. S. JOHNSTON,
Group Manager.

Gas Works,
50, East Dock Street,
Dundee.
October 2, 1953.

DRAUGHTSMAN (SENIOR) age 30/40, for large constructional engineering Co. in the Midlands. Wide gas holder and platework experience essential. Good opening for right man. Pension scheme. Write in confidence stating age, experience, and qualifications and salary expected to: Director & Secretary, Box No. 256, 19/21 Corporation Street, Birmingham, 2.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON & DISTRICT DIVISION
ASSISTANT CHEMIST AND
RELIEF SHIFT SUPERINTENDENT—
DUDLEY DISTRICT

CANDIDATES should have technical knowledge and practical experience of modern Gasworks practice. They should be experienced in the operation of continuous vertical retorts, automatically operated carburetted water gas plants and normal Gasworks ancillaries. The successful applicant will act as an assistant to the Chief Chemist except when required to perform relief shift duties in the event of holidays or sickness of the regular shift superintendents.

The salary for the post will be within Grade V (£460-£540 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. F. C. Briggs, Divisional General Manager, West Midlands Gas Board, Wolverhampton and District Division, Kensington House, Bath Street, Dudley, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON & DISTRICT DIVISION
DISTRIBUTION SUPERINTENDENT—
WOLVERHAMPTON DISTRICT

THE PERSON appointed will be responsible for the distribution system, comprising approximately 288 miles of main, in the County Borough of Wolverhampton and the outlying districts of Wednesfield, Tettenhall, Codsall and Albrighton. The duties will also include the supervision of a large Divisional Pipe Stockyard.

Applicants must have had extensive experience of the organising and day to day running of a distribution department including main and service laying, both low and high pressure, installation and maintenance of district governors and other distribution plant and the control of employees. The possession of the Institution of Gas Engineers Higher Grade Certificates in Gas Engineering (Supply) would be advantageous.

The salary for the post will be within Grade X (£665-£765 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications giving full details of age, qualifications and experience, together with the names of two referees should be addressed to Mr. F. C. Briggs, Divisional General Manager, West Midlands Gas Board, Wolverhampton & District Division, Kensington House, Bath Street, Dudley, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited from suitably qualified persons for the following pensionable appointments:—

MANCHESTER GROUP
GAS CONTROL SUPERVISORS—
GAYTHORN GAS WORKS, MANCHESTER

The salaries will be within Grade A.P.T. VII (£545-£625 per annum) according to age and experience.

The successful applicants will be required to control bulk supplies of gas over an extensive area, to keep records of gas makes, stocks and pressures, and to prepare day-to-day estimates. After a period of training they will be required to work on a shift system.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 1, within fourteen days.

LIVERPOOL GROUP
ASSISTANT CHEMIST

The commencing salary will depend on qualifications and experience, but will be not less than Grade A.P.T. VI (£490-£570 per annum).

Candidates should possess the Higher National Certificate in Chemistry or an equivalent technical qualification, and experience in the fuel industries would be an advantage.

Applications giving details of age, qualifications and experience, together with the names of two referees, should reach the Chief Personnel Officer, North Western Gas Board (Liverpool Group), Radiant House, Bold St., Liverpool, 1, within fourteen days.

EASTERN GAS BOARD

CAMBRIDGE DIVISION

SECOND TECHNICAL ASSISTANT—

BEDFORD DISTRICT

APPLICATIONS are invited for the above position. The salary will be within the range of Grades A.P.T. VI and VII of the National Joint Council for Gas Staffs, Provincial 'A' Scales. The successful applicant will be required to pass a medical examination and become a member of the Board's Superannuation Scheme.

Candidates should possess the Higher Grade Certificate of the Institution of Gas Engineers (Manufacture), or its equivalent and be experienced in the operation and control of all gas manufacturing and ancillary plant.

Applications stating age, qualifications and experience together with the names of two referees should be addressed to the undersigned within fourteen days of the appearance of this advertisement.

J. HUNTER-RIOCH,
General Manager.

52, Sidney Street,
Cambridge.
September 28, 1953.

EAST MIDLANDS GAS BOARD

NOTTS. & DERBY DIVISION

DERBY UNDERTAKING—

ASSISTANT DISTRIBUTION ENGINEER

APPLICATIONS are invited from suitably qualified persons for the appointment of ASSISTANT DISTRIBUTION ENGINEER at the above Undertaking.

Applicants must be experienced in High and Low Pressure Gas Distribution and Mainlaying, and should possess the Institution of Gas Engineers' Certificates in Gas Engineering (Supply). Salary Grade A.P.T. IX, Provincial 'A' (Scale £615/715 per annum), commencing at a figure commensurate with qualifications and experience.

The successful candidate may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating age and experience, giving full particulars of training and qualifications, together with the names of two referees, should be addressed to the undersigned for receipt within fourteen days of the appearance of this notice.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. & Derby Division,
Friar Gate,
Derby.

EAST MIDLANDS GAS BOARD

NOTTS. & DERBY DIVISION

GAS FITTER—NOTTINGHAM UNDERTAKING

BINGHAM STATION

A VACANCY EXISTS for a First Class Gas Fitter at the above Station. In addition to the installation and maintenance work on the district, the successful applicant will be required to carry out duties on the Holder Station.

The possession of a Driving Licence would be an advantage.

The tenancy of a house is offered on a Service Tenancy Agreement.

The rate of pay will be 3s. 7d. per hour with conditions in accordance with the East Midlands Area Joint Industrial Council.

Applications stating age, qualifications and experience should be addressed to Mr. J. S. Fox-Andrews, Manager, Nottingham Sub-Division, East Midlands Gas Board, 51/55, Lower Parliament Street, Nottingham, to be received not later than October 24, 1953.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts. & Derby Division,
Friar Gate,
Derby.

NORTHERN GAS BOARD

SUNDERLAND DIVISION

TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at the Sunderland Unit.

Applicants should be conversant with Gasworks plant or Coke Oven practice and be capable of carrying out routine chemical testing.

The appointment will be subject to the conditions of service set out in the Agreement of the National Joint Council for Gas Staffs and commencing salary will be within the range of £305/495 per annum.

Applications, with the names of two referees, should be sent to the undersigned not later than Monday, October 26, 1953.

W. O. KIRKWOOD,
Divisional General Manager.

Fawcett Street,
Sunderland.

WALES GAS BOARD

LLANELLY AND GOWERTON

UNDERTAKINGS

APPLICATIONS are invited for the position of ENGINEER AND MANAGER of the Llanelly and Gowerton Undertakings.

Candidates for the appointment, which will carry a salary of £1,200 per annum, must have had wide administrative experience and possess appropriate technical qualifications.

Applications, stating age, qualifications and experience together with details of present and previous appointments and names of two referees, should be received by the undersigned not later than October 27, 1953.

C. B. MAWER,
Secretary to the Board.

2, Windsor Place,
Cardiff.

CITY COUNCIL OF SINGAPORE

GAS DEPARTMENT

APPLICATIONS are invited for the posts of ASSISTANT GAS ENGINEER, DISTRIBUTION ENGINEER and ASSISTANT DISTRIBUTION ENGINEER each on a 3 years' agreement in the first instance.

2. Applicants for the post of (i) ASSISTANT GAS ENGINEER should be of good education and address and must possess the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture) *or* alternatively the Ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture) *plus* the Ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Supply) (or equivalent) and should preferably be Associate Members of the Institution of Gas Engineers. It is essential that the appointee should be about 35 years of age with a sound experience of general administration and must have had extensive practical experience in Gas Manufacture, with preferably experience in Distribution. The appointee must be fully capable of supervising normal Gas Works routine, staff and labour concerned and should also be experienced in preparing plans for alterations to Works layout, installation and new plant, etc.

(ii) DISTRIBUTION ENGINEER should be about 35 years of age, of good education and address and must possess the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Supply) *or* alternatively the Ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Supply) *plus* the City & Guilds Final Certificate in Gas Fitting (or equivalent) and should preferably be Associate Members of the Institution of Gas Engineers. It is essential that the appointee shall be fully experienced in the supervision of the Distribution side of a Gas undertaking and that he shall have the necessary drive, personality, sales organisation and administrative ability to ensure the proper control and direction of all the activities of the Distribution Section.

(*Continued in next column*)

(iii) ASSISTANT DISTRIBUTION ENGINEER should be between 23 and 27 years of age and should preferably be unmarried. They must hold at least the Ordinary Grade Certificate of the Institution of Gas Engineers in Engineering (Supply) and it is desirable that they also hold the City & Guilds Certificate in Gas Fitting (Final Grade). They must have a good practical knowledge of gas fitting, mains and service laying and it is also desirable that they have a background knowledge of the modern application of gas in industry and experience of repairs to dry meters. Applicants must have had at least two years administrative and supervisory experience in the Distribution Department of a Gas Undertaking.

3. The commencing monthly salary offered for the posts of ASSISTANT GAS ENGINEER and DISTRIBUTION ENGINEER is between $910 (£1,274 per annum) and $1,030 (£1,442 per annum) and for the post of ASSISTANT DISTRIBUTION ENGINEER between $550 (£770 per annum) and $670 (£938 per annum) depending upon the appointee's qualifications and experience.

Suitable applicants for the posts of Assistant Gas Engineer and Distribution Engineer aged at least 35 who possess the above qualifications and are considered to have the necessary experience may be offered a starting salary of $1,030 per month.

4. If placed on the permanent establishment after satisfactory completion of the Agreement the basic salary for the posts of ASSISTANT GAS ENGINEER and DISTRIBUTION ENGINEER will be in the scale $630 rising to $1,200 per month (£882 to £1,680 per annum) and for the post of Assistant Distribution Engineer in the scale $550 rising to $1,070 per month (£770 to £1,498 per annum).

5. Expatriation allowance and cost of living allowance at such rates as may be approved by the Council from time to time are payable. The existing rates are as follows :—

Expatriation Allowance—
- £287 per annum on basic salaries up to $740 a month ;
- £343 per annum on basic salaries from $871 to $1,000 a month.

Cost of living Allowance—
- £238 per annum on basic salaries of $550 to $910 a month and £224 per annum on basic salaries of $950 to $1,030 a month for a single man ;
- £315 per annum rising to £348 per annum on basic salaries of $550 to $670 a month and £385 per annum on basic salaries of $910 to $1,030 a month for a married man with no children ;
- £412 per annum rising to £471 per annum on basic salaries of $550 to $670 a month and £560 per annum on basic salaries of $910 to $1,030 a month for a married man with one or more children.

6. For a single man the minimum total emoluments on a basic monthly salary of $550 and $910 would amount to £1,295 and £1,715 per annum respectively ; for a married man with no children £1,372 and £2,002 per annum respectively ; and for a married man with one or more children £1,469 and £2,177 per annum respectively.

7. $1 equals 2s. 4d.

8. Partly furnished quarters provided if available at 6% of basic salary or housing allowance paid in lieu.

9. *Passages*—For the posts of Assistant Gas Engineer and Distribution Engineer First Class Passages will be provided for appointees, their wives and own children under the age of 12 years at the date of sailing and for the post of Assistant Distribution Engineer Tourist Class passages subject to a maximum of three full passages for each officer.

10. *Leave*—1 month per year of service plus period of voyage, on satisfactory termination of agreement or 4 days a month of resident service plus voyage leave after 48 months if appointed to the Permanent Staff and thereafter at shorter periods. 14 days local leave per year.

11. *Provident Fund*—Compulsory Provident Fund contributions at present 7½% of salary to which the Council donate 7½% rising to 10% after 10 years' service, 15% after 15 years' service and 20% after 20 years' service. This scheme is under review.

12. Applications in DUPLICATE giving full personal and technical information, with *copies* of 3 recent Testimonials also in duplicate to Messrs. Allen & Williams, Agents to the City Council, 1, Victoria Street, London, S.W.1, before Tuesday, October 20th, 1953.

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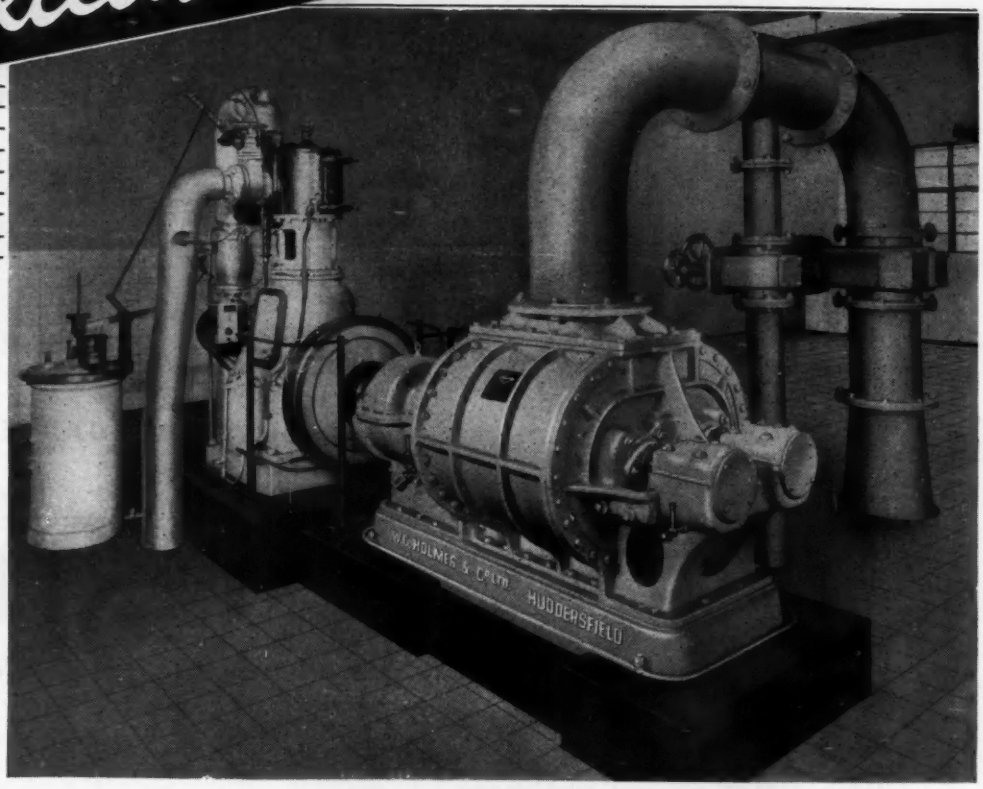

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industrial gas compressors

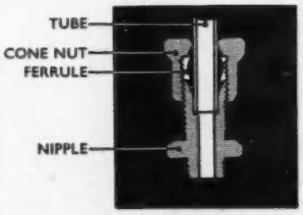
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see *illustration right*) *are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" × 7½".*
CAPACITY RANGE: *100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.*

TYPE 4 COMPRESSORS (*not illustrated*) *are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.*
CAPACITY RANGE: *500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.*
AREA OCCUPIED: *from 9¼" × 16½" to 61" × 27".*

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner *with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.* ***Size Range:*** *1", 1¼", 1½", 2" and 2½" outlets.* ***Capacity Range:*** *45-280 cub. ft. of gas per hour.*

Brass non-blow-off head types: *deal with 5 to 10 cub. ft. of gas per hour.*

Stainless steel, "F" type head, burner: *deals with 8 cub. ft. of gas per hour.*

Perforated head type burner: *deals with 10 to 15 cub. ft. of gas per hour.*

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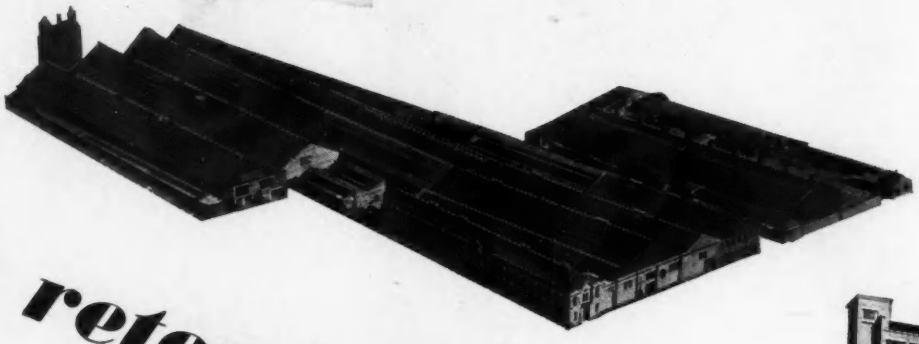
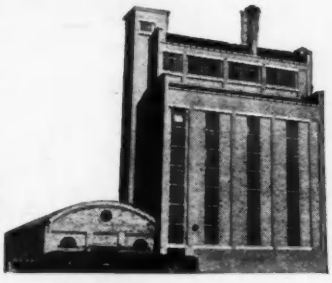
research plant



to retort house



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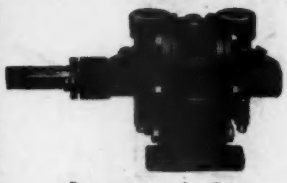
GWI

Pulsometer

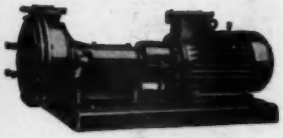
PUMPS AND FILTERS

Filtration Plant in Gasworks

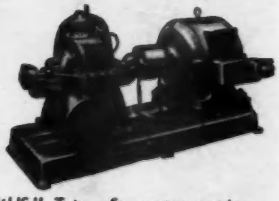
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



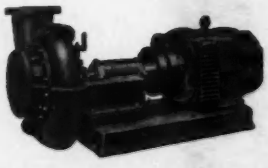
Rotary pump for Oil transfer duties.



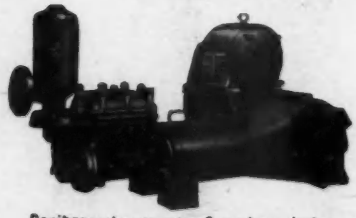
Stoneware pump for Corrosive and chemicals.



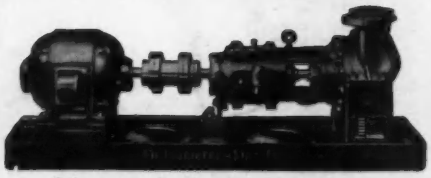
"HS" Type—for water services. All heads up to 500 feet.



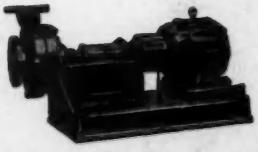
Slurry pump for coal washing and abrasive liquids.



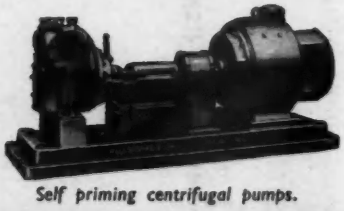
Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

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